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SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 10 IN SET 227

PROPERTY OF
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3924 MEADE ST.
DENVER, COLORADO

Philco chassis R-81A, B, D-81 (Code 129), R-181, U, D-181 (Code 130) television receivers are covered in Photofact Folder 10 — Set 227.

In later production chassis R-181, D-182 (Code 131) and several new models were added.

A list of all the models, with chassis, picture tube and UHF tuner, if any, used in this series of chassis is given below.

MODEL	CODE	RF CH.	DEFL. CH.	UHF TUNER	CRT
A-T1816	129	R-81A	D-81		17YP4
A-T1856W	129	R-81A	D-81		17YP4
A-T2230	129	R-81A	D-81		21EP4A
A-T2272	129	R-81A	D-81		21EP4A
A-T2275S	129	R-81A	D-81		21EP4A
A-UT2272	129	R-81A	D-81	UT21C	21EP4A
18B3000	130	R-181	D-181		17YP4
18B3001	130	R-181	D-181		17YP4
18B3100, HM, L, W	130	R-181	D-181		17YP4
18BU3000	130	R-181U	D-181	UT21D	17YP4
18BU3001	130	R-181U	D-181	UT21D	17YP4
18BU3100, HM, L, W	130	R-181U	D-181	UT21D	17YP4
22B4000, X, XD	130	R-181	D-181		21ZP4A
22B4001, E, L	130	R-181	D-181		21WP4
22B4003	130	R-181	D-181		21ZP4A
22B4100, A, L, X	130	R-181	D-181		21ZP4
22B4101	129	R-81B	D-81		21ZP4
22B4103, L	130	R-181	D-181		21WP4
22B4105, L	130	R-181	D-181		21ZP4A
22B4301	130	R-181	D-181		21ZP4A
22B4303	130	R-181	D-181		21ZP4A
22BU4000	130	R-181U	D-181	UT21D	21ZP4A
22BU4000X, XD	130	R-181	D-181	UT25	21ZP4A
22BU4001, E, L	130	R-181	D-181	UT21	21WP4
22BU4003	130	R-181U	D-181	UT21D	21ZP4A
22BU4100, A, L, X	130	R-181U	D-181	UT21D	21ZP4A
22BU4101	129	R-81B	D-81	UT21C	21ZP4A
22BU4103, L	130	R-181	D-181	UT21	21WP4
22BU4105, L	130	R-181U	D-181	UT21D	21ZP4A
22BU4303	130	R-181U	D-181	UT21D	21ZP4A
22C4010, L	130	R-181	D-181		21WP4A
22C4010,	131	R-181	D-182		21XP4

PHILCO RF CHASSIS R-81A, B, R-181, DEFLECTION CHASSIS D-81, D-181, D-182

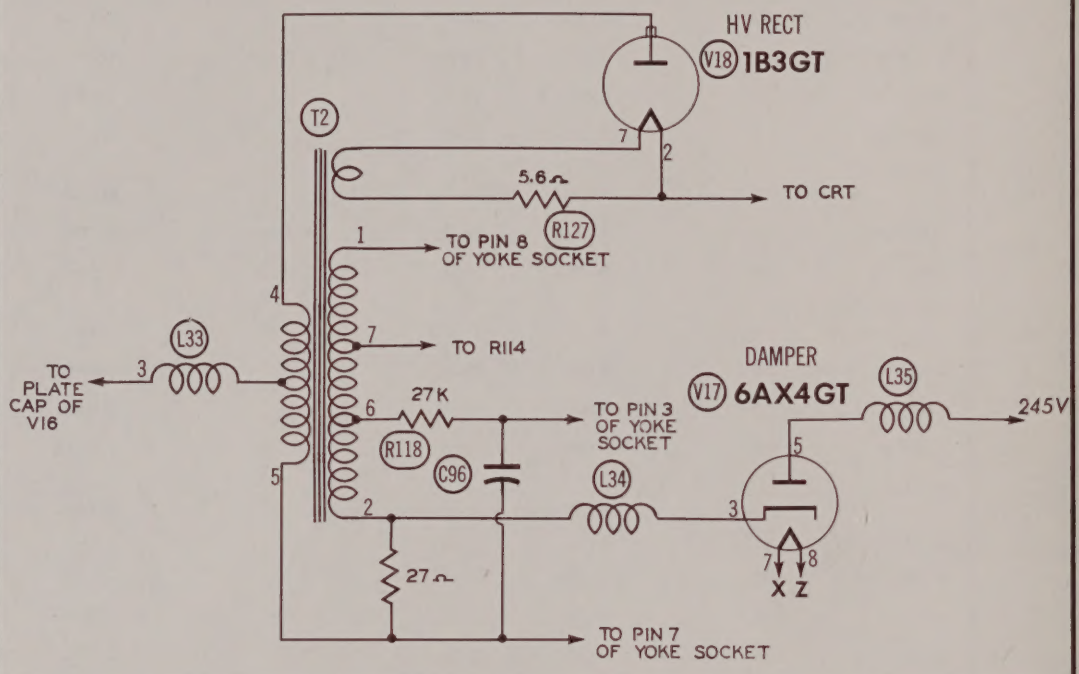
(Con't on reverse side)

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1955 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

	MODEL	CODE	RF CH.	DEFL. CH.	UHF TUNER	CRT
	22C4012	130	R-181	D-181		21WP4
	22C4012	131	R-181	D-182		21XP4
	22C4014	130	R-181	D-181		21WP4
	22C4014	131	R-181	D-182		21XP4A
	22C4122	130	R-181	D-181		21ZP4B
	22C4122	131	R-181	D-182		21XP4A

Ch. D-182

Deflection chassis D-182, used in Code 131 television receivers, is identical to chassis D-181, used in Code 130, except an electrostatic focus picture tube (21XP4, A) and a different horizontal output transformer (part no. 32-8624) is used. A partial schematic is given below which shows the revised horizontal output circuit. The 76-8998, centering magnet is also used with the electrostatic focus tube.



UT21, UT21C, UT21D, UT25

UHF tuner model UT21 is used in models 22BU4001, E, L and 22BU4103, L. UHF tuner model UT21C is used in models A-UT2272 and 22BU4101, UHF tuner model UT25 is used in model 22B4000X, XD. All other UHF models use the UT21D UHF tuner. Schematic of the UT21, UT21C and UT25 UHF tuners are given on the next page. The schematic for the UT21D, UHF tuner is given on page 13, in Photofact Folder 10 — Set 227.

Ch. D-181

In later production of deflection chassis D-181 the following production changes were made.

Ch. D-181 (Run 10)

TO CENTER THE RANGE OF THE VERTICAL HOLD CONTROL

R90 was reduced from 510KΩ to 390KΩ.

Ch. D-181 (Run 11)

TO REDUCE V18 FILAMENT VOLTAGE

R121 was increased from 4.7Ω to 5.6Ω.

Ch. D-181 (Run 12)

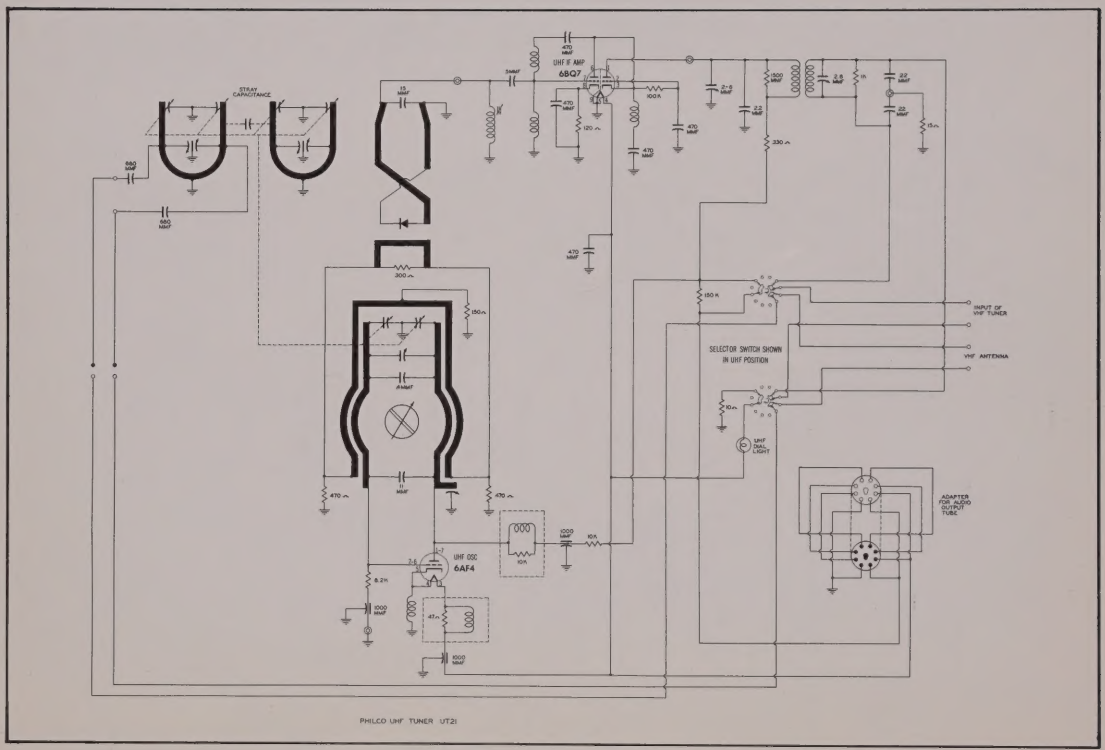
SELENIUM RECTIFIERS CHANGED

The selenium rectifiers (M1 & M2) were changed from 350MA to 450MA units (part no. 34-8003-8).

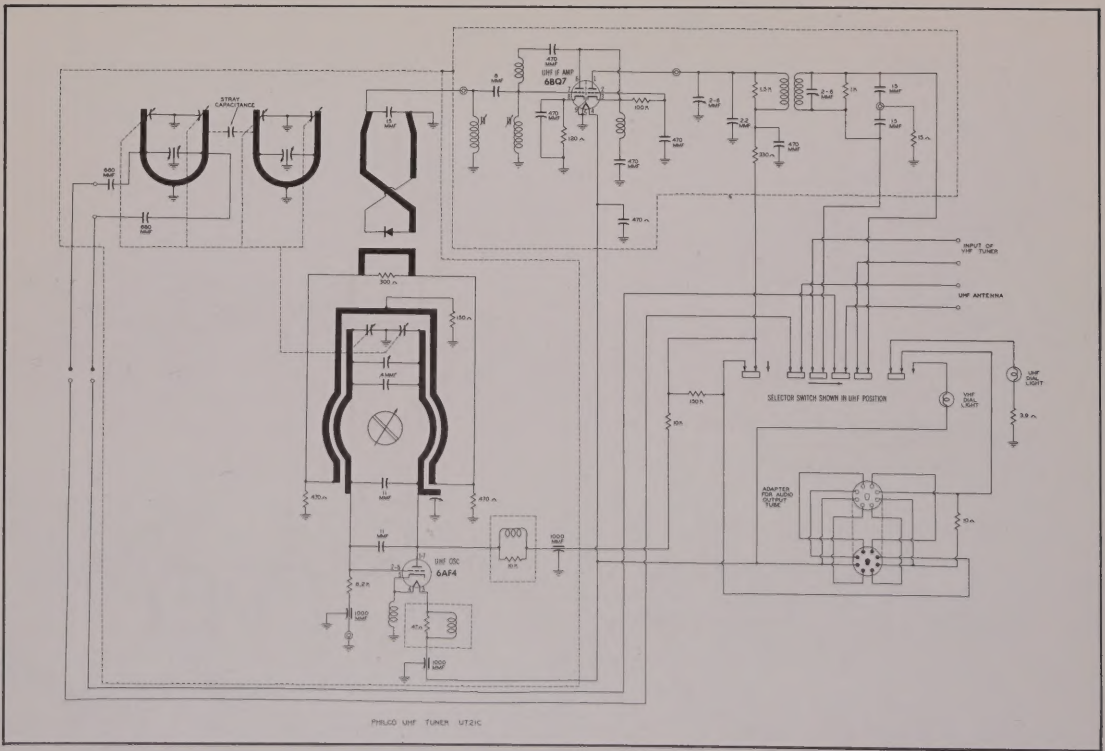
Ch. D-181 (Run 13)

TO INCREASE THE RANGE OF THE HEIGHT CONTROL

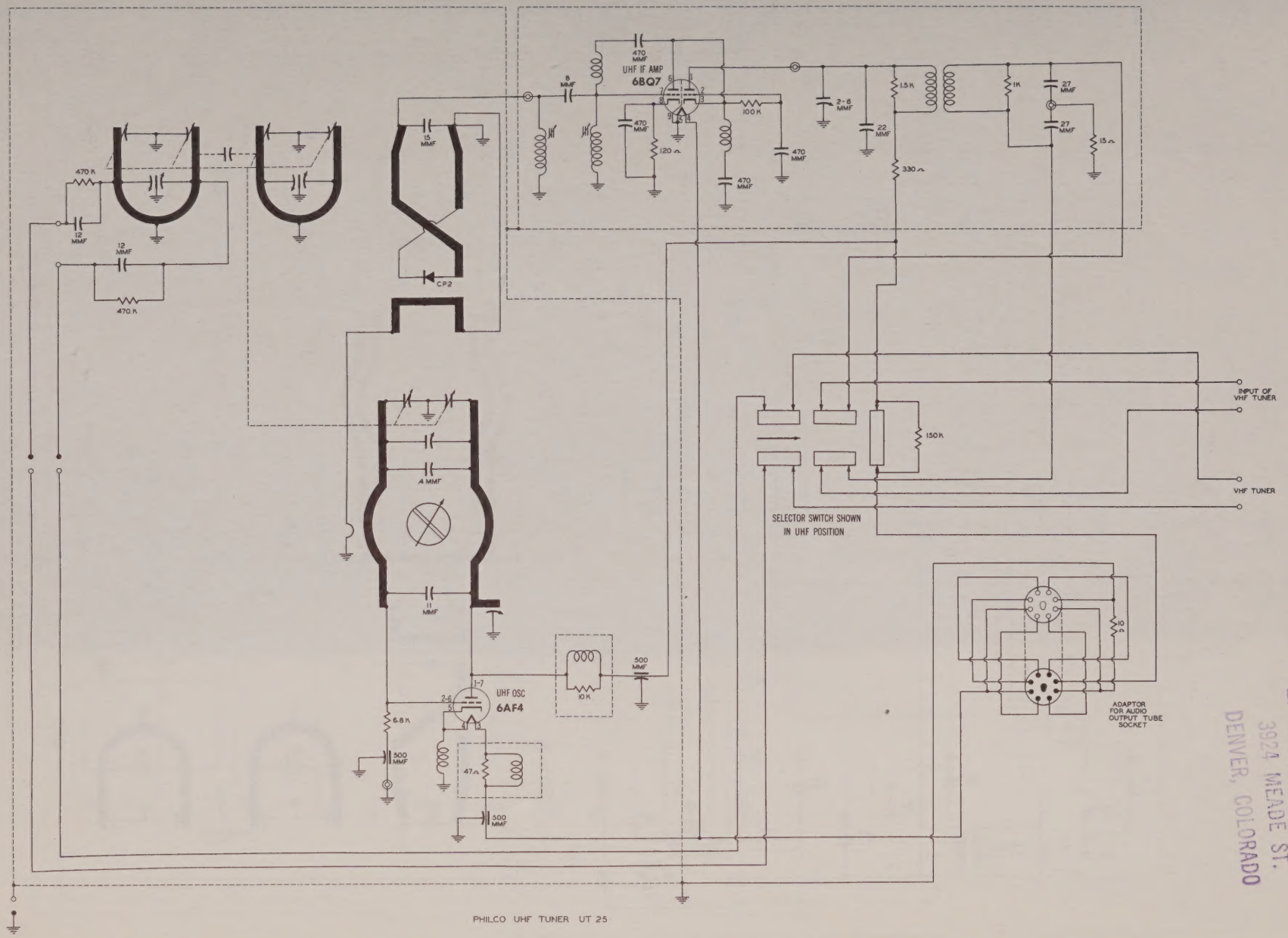
R92 was increased from 270KΩ to 390KΩ.



PHILCO UHF TUNER UT21



PHILCO UHF TUNER UT21C



PHILCO UHF TUNER UT 25

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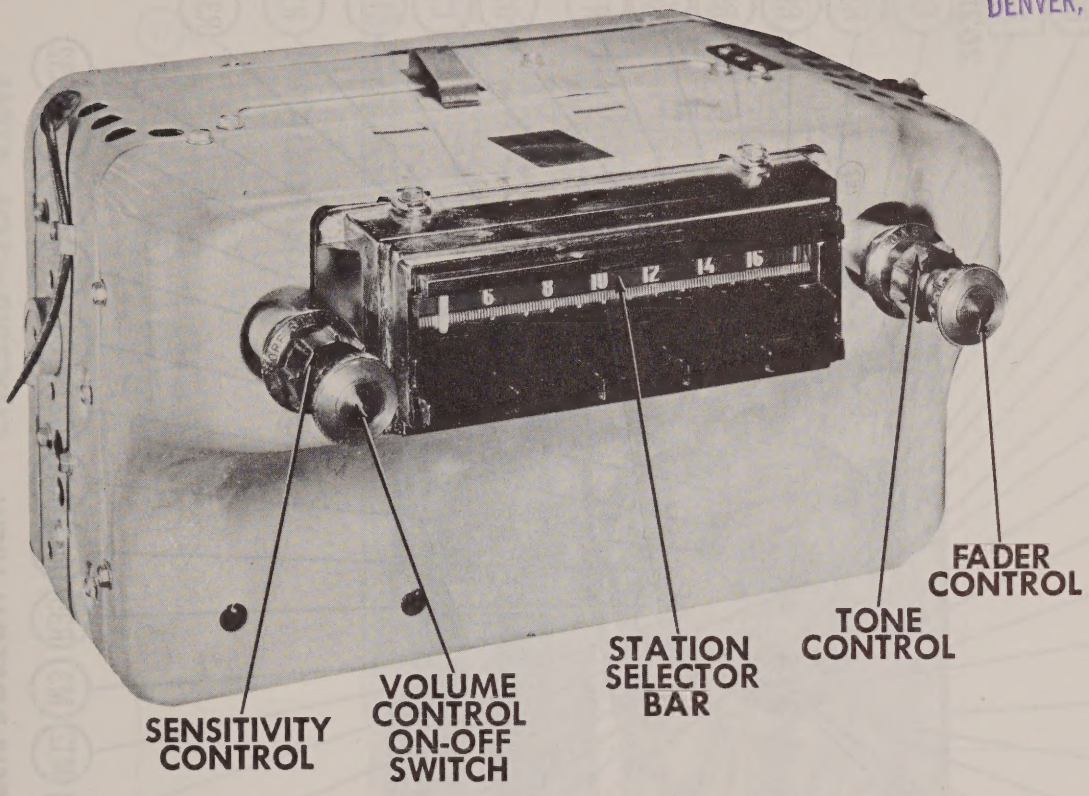
CADILLAC
MODELS 7264165, 7264185



CADILLAC
MODELS 7264165, 7264185

TRADE NAME	Cadillac Models 7264165, 7264185 (For 1954 Cadillac Automobiles)
MANUFACTURER	Cadillac Motor Car , Div. OF Gen. Motors Corp., Detroit, Michigan
TYPE SET	Battery Operated Custom Built Automobile AM Superheterodyne Receiver
TUBES (Nine)	Types 12BA6 RF Amp., 12BE6 Conv., 12BA6 IF Amp., 12AV6 Det.-AF Amp., 12AV6 AVC-Phase Inverter, (2) 6V6GT Output, 12AU7 Trigger Amp., 0Z4 Rectifier
POWER SUPPLY	12 Volt Storage Battery RATING 3.4 Amp. @ 12.6Volts DC
TUNING RANGE-BROADCAST	540KC-1600KC

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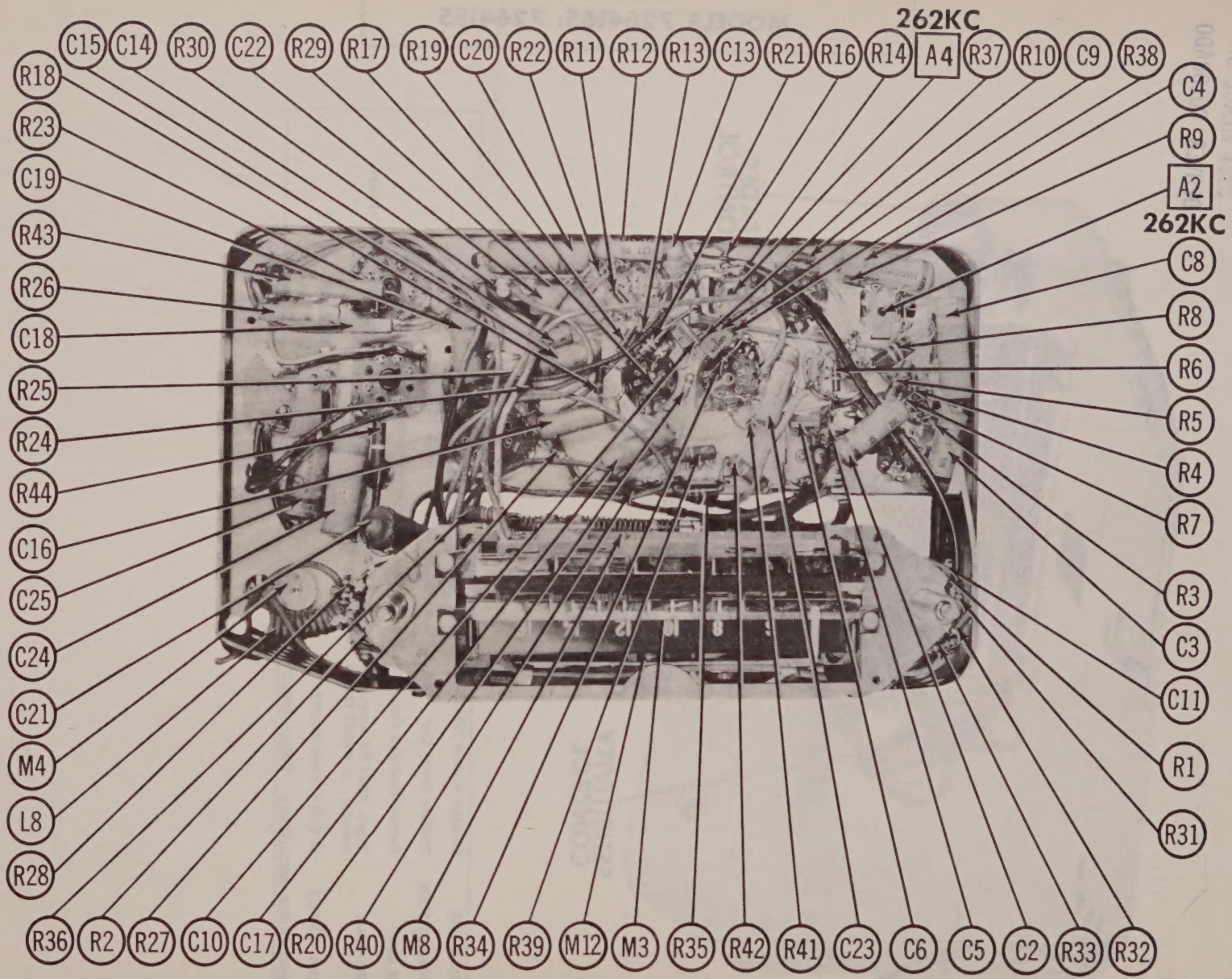


CHASSIS BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		CADILLAC PART No.	STANDARD REPLACEMENT		
V1	RF Amp.	12BA6	12BA6	7BK	
V2	Converter	12BE6	12BE6	7CH	
V3	IF Amp.	12BA6	12BA6	7BK	
V4	Det-AF Amp.	12AV6	12AV6	7BT	
V5	Phase Inverter-AVC	12AV6	12AV6	7BT	
V6	Output	6V6GT	6V6GT	7S	
V7	Output	6V6GT	6V6GT	7S	
V8	Trigger	12AU7	12AU7	9A	
V9	Rectifier	0Z4	0Z4	4R	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

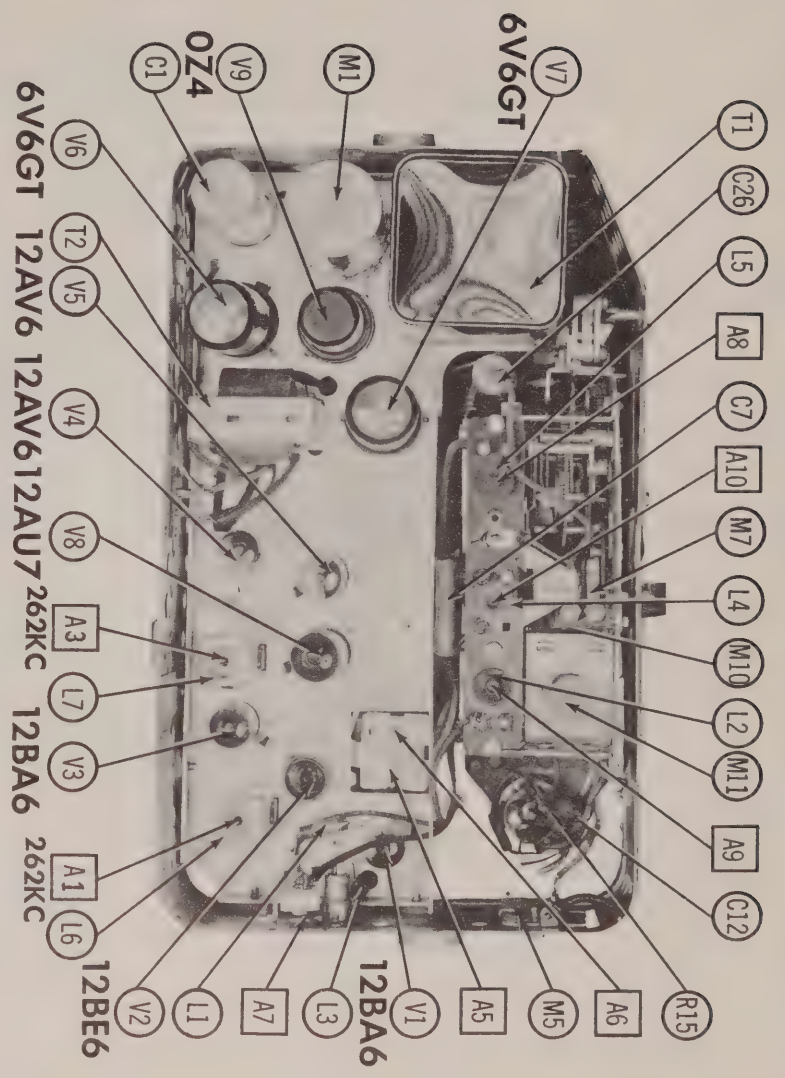
ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	CADILLAC PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	■20	400	M-908	AFH3-120		C099		FP345.8	TVL-3678	
B	▲20	400								
C	20	25								
C2	.05	200	6512	P288-05	DF-503	CUB2S5		PT415	2TM-S5	
C3	.05	200	6512	P288-05	DF-503	CUB2S5		PT415	2TM-S5	
C4	.1	200	6590	P288-1	DF-104	CUB2P1		PT401	2TM-P1	
C5	68	500	G-680	1468-680	D6-680	5W5Q68	GP1K-680	UC-5468	1FM-47	
C6	39	500	G-390	1469-390	TCZ-39	22R5Q39	NP0K-390		MS-44	
C7	260		7257567							
C8	.1	400	6513	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C9	100	500	1219498	1468-101	D6-101	5W5T1	GP1K-101	MC235	1FM-31	
C10	100	500	1219498	1468-101	D6-101	5W5T1	GP1K-101	MC235	1FM-31	
C11	82	500	G-820	1468-820	D6-820	5W5Q82	GP1K-820		5GA-Q82	
C12	.002	600	6528	P688-002	D6-202	CUB6D2	GP2-333-202	PT622	6TM-D2	
C13	.005	600	6531	P688-005	D6-502	CUB6D5	GP2-333-502	PT625	6TM-D5	
C14	220	500	G-221	1468-221	D6-221.	5W5T22	GP2K-221	MC240	1FM-325	
C15	.005	600	7230912	P688-005	D6-502	CUB6D5	GP2-333-502	PT625	6TM-D5	
C16	.005	600	6531	P688-005	D6-502	CUB6D5	GP2-333-502	PT625	6TM-D5	
C17	.01	600	6533	P688-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	
C18	220	500	G-221	1468-221	D6-221	5W5T22	GP2K-221	MC240	1FM-325	
C19	.006	800	H-602	P1088-006		CUB16D6		PT1626	MB-D6	
C20	.15	100	1218880	P288-15		CUB2P15		PT4015	2TM-P15	
C21	.25	200	6591	P288-25		CUB2P25		PT4025	2TM-P25	
C22	.008	600	H-802	P1688-008		CUB16D8		PT1628	6TM-D8	
C23	.002	600	6528	P688-002	D6-202	CUB6D2	GP2-333-202	PT622	6TM-D2	
C24	.007	1600	H-702	P1688-007		CUB16D7		PT1627	MBD7	
C25	.47	100	7257906	P185-5		MP2P5		RF480	68P20	
C26	.5	100	7263816	P185-5		MP2P5		RF480	68P20	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	CADILLAC PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	Switch		7264639					Tone Switch - Panel - Note 1
B	10Ω	2						Speaker Fader-Wire Wound - Rear
R2A	Switch		7264638					Sensitivity Switch - Panel
B	1.5Meg	½						Volume & Switch Tapped At 350KΩ-Rear

Note 1: Used in model 7264165--Model 7264185 uses control part no. 7264611.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	CADILLAC PART No.	IRC PART No.	
R3	2.2Meg	½	A-225	BTS-2.2Meg	
R4	100Ω	½	A-101	BTS-100	
R5	10KΩ	1	B-103	BTA-10K	
R6	22KΩ	½	A-223	BTS-22K	
R7	330KΩ	½	A-334	BTS-330K	
R8	12KΩ	2	1212491	BTB-12K	
R9	10Ω	½	A-100	BTS-10	
R10	150Ω	½	A-151	BTS-150	
R11	6.8Meg	½	A-685	BTS-6.8Meg	
R12	150Ω	½	A-151	BTS-150Ω	
R13	220KΩ	½	A-224	BTS-220K	
R14	470KΩ	½	A-474	BTS-470K	
R15	47KΩ	½	A-473	BTS-47K	
R16	330KΩ	½	A-334	BTS-330K	
R17	1.5Meg	½	A-155	BTS-1.5Meg	
R18	6.8Meg	½	A-685	BTS-6.8Meg	
R19	3300Ω 5%	½	1220173	BTS-3300 5%	
R20	220KΩ	½	A-224	BTS-220K	
R21	56KΩ 5%	1	1220213	BTA-56K 5%	
R22	330Ω	½	A-331	BTS-330	
R23	2200Ω	½	A-222	BTS-2200	
R24	220KΩ	½	A-224	BTS-220K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	CADILLAC PART No.	IRC PART No.	
R25	100KΩ	½	A-104	BTS-100K	
R26	390Ω	2	B-391	BTB-390	
R27	220KΩ	½	A-224	BTS-220K	
R28	39KΩ	½	A-393	BTS-3900	
R29	3300Ω	½	A-332	BTS-3300	
R30	1200Ω	½	1213236	BTS-1200	
R31	220Ω	½	A-221	BTS-220	
R32	560Ω	½	1213239	BTS-560	
R33	2200Ω	½	A-222	BTS-2200	
R34	5.6Meg	½	1215562	BTS-5.6Meg	
R35	47KΩ 5%	1	B-473	BTA-47K	
R36	12KΩ	1	1212491	BTA-12K	
R37	1Meg 5%	½	1220169	BTS-1Meg 5%	
R38	1.5Meg 5%	½	1219492	BTS-1.5Meg 5%	
R39	6800Ω	1	1216154	BTA-6800	
R40	1000Ω 5%	½	1220176	BTS-1000 5%	
R41	120KΩ	½	1213271	BTS-120K	
R42	47KΩ	1	1220188	BTA-47K	
R43	1800Ω	2	B-562	BTB-1800	
R44	15KΩ	1	B-153	BTA-1500	
R45	820Ω	1	1216152	BTA-820	Note 1

Note 1: Not used in some versions.

TRANSFORMER (VIBRATOR)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	CADILLAC PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	12VCT @ 2A	450VCT .063ADC			6064		P-4051 ①			

① Drill new mounting holes.

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	CADILLAC PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T2	7.9KΩ	4.4Ω	6063	A-2936	A-3852	S-15X	Z1007	22S87	

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	CADILLAC PART No.	JENSEN PART No.	QUAM PART No.	
SP1	6" X 9"	PM	4.4Ω	7264205 7262245 ①	8T-811 Mod. P69-T	69A3	① 6" X 9" rear seat speaker used in model 7264165 only.

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	CADILLAC PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coupling Coil	.6Ω		7255738	19-1004		4610	7 Microhenries
L2	Ant. Coil	9.5Ω		7257979				
L3	Ant. Coupling Coil	5.3Ω		7240251	19-6022		4626	26 Microhenries
L4	RF Coil	9.5Ω		7257979				
L5	Osc. Coil	.9Ω	4Ω	7263287				
L6	Input IF	39Ω	39Ω	1219508	16-6752	BC-350	12-H1	
L7	Output IF	31Ω	31Ω	1220204	16-6754	BC-354	12-H6	
L8	Fil. Choke	0Ω		1217846	19-1001		4604	1.4 Microhenries

PARTS LIST AND DESCRIPTIONS (Continued)

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA				NOTES
				CADILLAC PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	
M1	Intermupter	12V	115∿	8550	6330	G-874/G-883	6330	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			CADILLAC PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	7AG	7½A 32V	7263227		30307.5 (7AG-7½A-32V)		AGW 7½	

MISCELLANEOUS

ITEM No.	PART NAME	CADILLAC PART No.	NOTES
M3	Dial Light		#53, Bayonet
M4	Spark Plate	1217848	
M5	Spark Plate	1219768	
M6	Switch	7264683	Tone-Used in model 7264185 only.
M7	Switch	7263340	Tuner Return
M8	Switch	7263912	Station Selector
M9	Switch	7260629	Foot Station Selector
M10	Relay	1220326	
M11	Solenoid	7263425	
M12	Dial Light		#57, Bayonet
A5, A6	Trimmer	7242454	Dual-RF & Osc.
A7	Trimmer	7264626	Antenna
	Knob	1459925	On-Off-Volume & Fader
	Knob	1459673	Sensitivity
	Knob	1459674	Tone
	Tab Rail Board	7263916	
	Contact	1220193	Push-button Slide (Set of 5)
	Contact	1220191	Selector Tab (Set of 5)
	Indicator	1220192	Selector Tab (Set of 5)
	Push Button & Slide Assembly	7263658	Tuner
	Core Bar Ass'y.	7259178	Tuner
	Pointer Arm Assembly	7264673	Tuner
	Pointer Tip	1220307	
	Dial Glass	7263586	
	Dial Backplate Assembly	7264636	

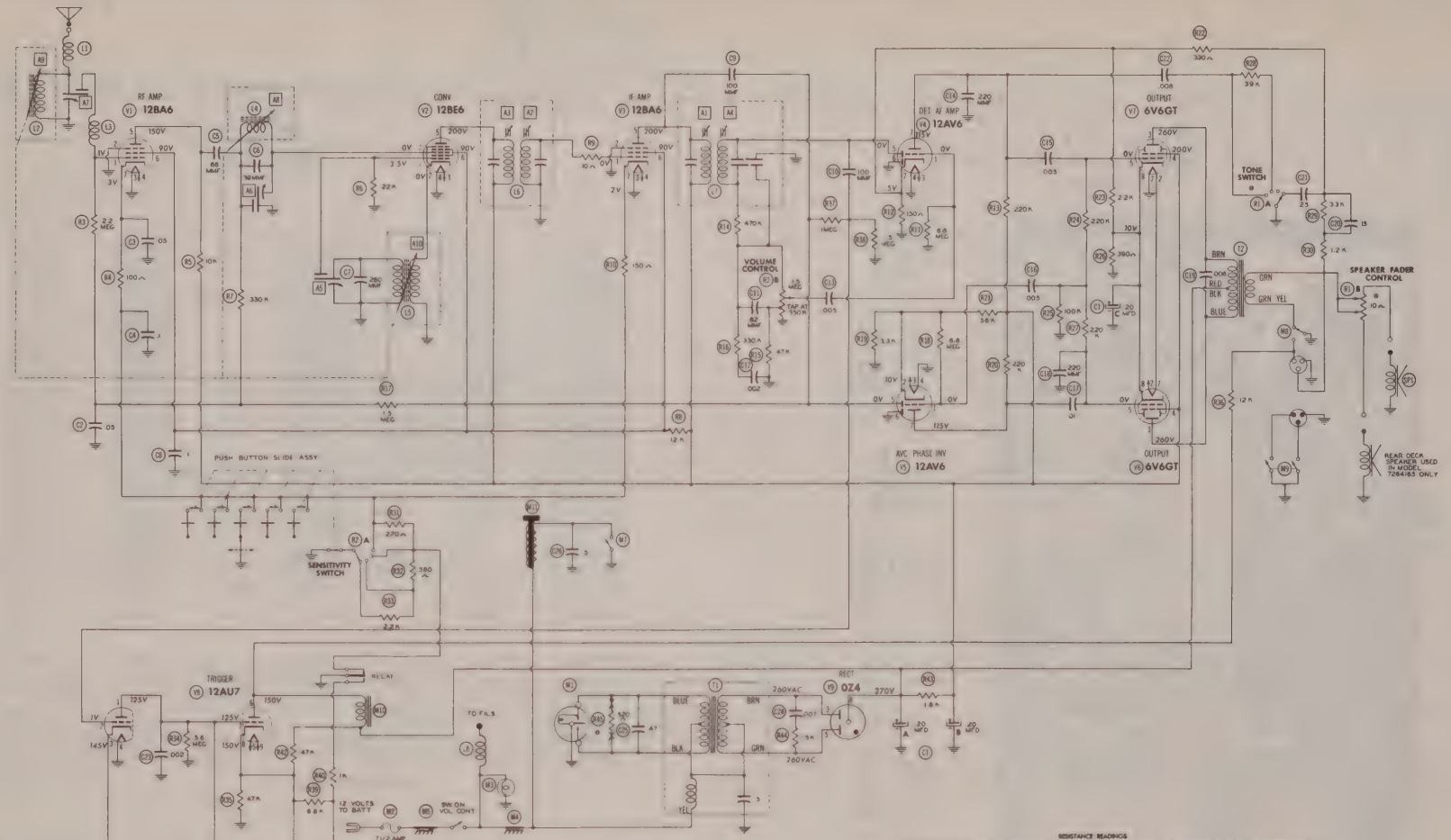
ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Turn sensitivity control to maximum.
Turn tone control to treble.
* Tune to high freq. end stop by placing 0.070 feeler gauge (or bare #13 wire) in slot against high freq. end stop. Press selector bar to allow the planetary arm to run up against feeler guage. Turn radio off and then on so that dial pointer will retain same position after removal of feeler gauge.
**Check oscillator core (A10) setting before adjusting A5, A6 and A7. From mounting end of coil form to rear of core should be 1 25/32". The core adjustment, if necessary, should be made with an insulated screwdriver from mounting end of coil.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1	.1MFD	High side to pin 7 (grid) of 12BE6 (V2). Low side to chassis.	262KC (400∿ Mod.)	High frequency end stop.*	Across Capacitor (C2).	A1, A2 A3	Adjust for maximum output. Repeat adjustment until no further increase in output is noted.
2	"	"	"	"	"	A4	Adjust for minimum output.
3	68MMF	High side to antenna connector. Low side to chassis.	1615KC	" **	"	A5, A6 A7	Adjust in order given for maximum output.
4	"	"	600KC	Tune to 600KC signal.	"	A8, A9	Adjust for maximum output.
5	"	"	1615KC	Tune to 1615KC signal.	"	A6, A7	"
6	"	"	1000KC	Tune to 1000KC signal.	"		If necessary, adjust dial pointer guide bar so that dial pointer reads 1000KC. With radio installed and antenna plugged in, tune to a weak station between 600 and 1000KC. Adjust A7 for maximum volume.

3924 MLC
DENVER, COLORADO



IF = 262KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	12BA6	6.2Meg	0Ω	0Ω	Ω	11.8KΩ	114KΩ	40Ω		
V 2	12BE6	22KΩ	ΩΩ	Ω	0Ω	11.8KΩ	114KΩ	4.4Meg		
V 3	12BA6	40Ω	0Ω	0Ω	Ω	11.8KΩ	114KΩ	390Ω		
V 4	12AV6	6.6Meg	150Ω	Ω	0Ω	800KΩ	0Ω	†220KΩ		
V 5	12AV6	6.6Meg	3.3KΩ	Ω	0Ω	2.5Meg	0Ω	†220KΩ		
V 6	6V6GT	0Ω	0Ω	†180Ω	†1.8KΩ	330KΩ	150Ω	Ω	2.2KΩ	
V 7	6V6GT	INF	Ω	†180Ω	†1.8KΩ	330KΩ	100KΩ	Ω	2.2KΩ	
V 8	12AU7	190KΩ	1.5Meg	50KΩ	0Ω	Ω	†1.8KΩ	160KΩ	40KΩ	INF
V 9	0Z4	0Ω	INF	280Ω	INF	240Ω	INF	INF	18KΩ	

† MEASURED FROM PIN #8 OF V9

1. DC voltage measurements taken with vacuum tube voltmeter.
2. AC voltages measured at 1000 cycles.
3. Resistance readings are shown in ohms.
4. Measured voltages are from chassis to point shown negative.
5. Battery voltage maintained at 12 volts during voltage readings.
6. Position numbers of components in switch shown position a variation of ± 10% in voltage and resistance readings.
7. Volume control & oscillator no signal applied for voltage measurements.

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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L. F. B.
3924 MEADE ST.
DENVER, COLORADO

EMERSON MODELS
800B, 802B (Ch. 120159-B)

EMERSON MODELS
800B, 802B (Ch. 120159-B)

TRADE NAME	Emerson Model 800B, 802B (Ch. 120159-B)
MANUFACTURER	Emerson Radio & Phono Corp., 111 Eighth Ave., New York, N. Y.
TYPE SET	AC Operated Phono Amplifier With 3 Speed Automatic Record Changer
TUBES (Four)	Types 12AX7 AF Amp., (2) 35L6GT Output, 35Z5GT Rectifier
POWER SUPPLY	110-120 Volts AC - 60 Cycles RATING .30 Amp. @ 117 Volts AC

FOR SERVICE INFORMATION ON RECORD CHANGER UNIT EMERSON MODEL 819074--SEE SIMILAR V-M MODEL 950--PHOTOFACT SET 216--FOLDER 11.

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PARTS LIST AND DESCRIPTIONS

EMERSON
MODEL 800B (Ch. 120159-B)

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		EMERSON PART No.	STANDARD REPLACEMENT		
V1	AF Amp-Phase Inverter	12AX7	12AX7	9A	
V2	Output	35L6GT	35L6GT	7AC	
V3	Output	35L6GT	35L6GT	7AC	
V4	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	EMERSON PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	40	150	925248	PRS150/80-40-20		BBRT842-15		TCT3117	TVA-3455	
B	80	150								
C	20	150								
C2	.005	600	123753	P688-005	D6-502	CUB6D5	GP2-333-502	PT625	6TM-D5	
C3	.1	400	922515	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C4	.033	200	922234	P488-033				PT4133	6TM-S33	
C5	.047	200	922354	P288-047	DF-503	CUB2S47		PT4147	2TM-S47	
C6	100	500	911161	1468-101	D6-101	5W5T1	GP1K-101	MC235	1FM-31	
C7	.1	200	922203	P288-1	DF-104	CUB2P1		PT401	2TM-P1	
C8	.1	200	922203	P288-1	DF-104	CUB2P1		PT401	2TM-P1	
C9	.039	400	922202							
C10	.047	400	922554	P488-047	DF-503	CUB4S47		PT4147	4TM-S47	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	EMERSON PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	7500Ω	½	390245	Q11-115	A47-7500-S	AB-13	U-20	Tone
B	Shaft		Not Req.	Not Req.	KS8-3	AK-4	Not Req.	Attach to R1A
R2A	3.25Meg	½	390244			ABT-8515		Volume Tapped at 260KΩ
B	Shaft		Not Req.			AK-4		Attach to R2A

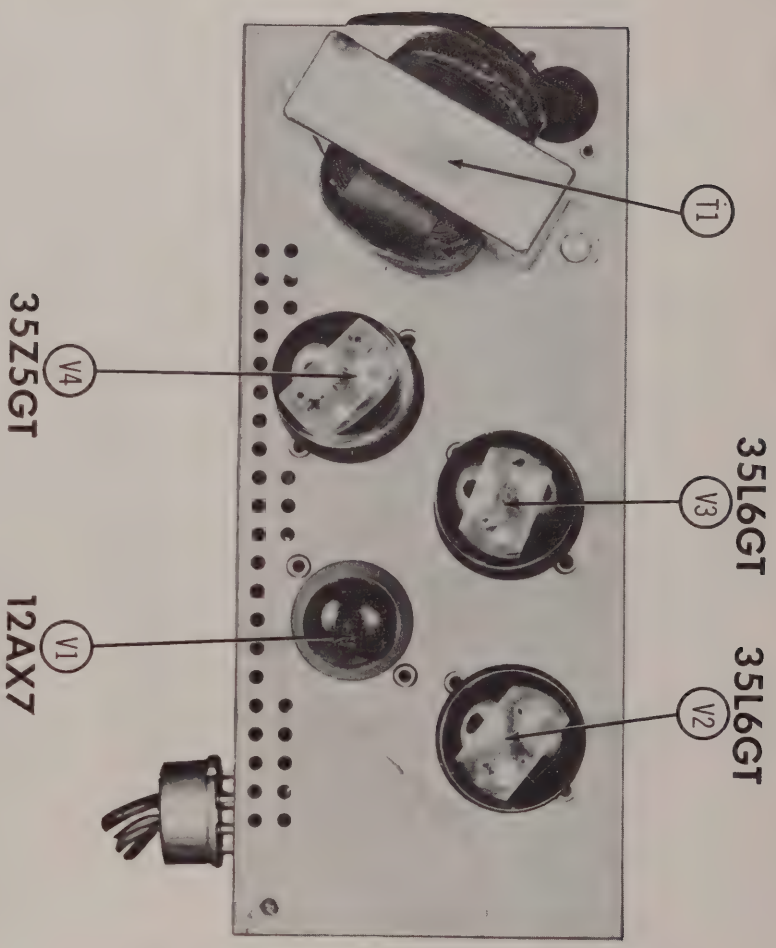
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	EMERSON PART No.	IRC PART No.	
R3	47KΩ	½	350892	BTS-47K	
R4	2.2Meg	½	351292	BTS-2.2Meg	
R5	18KΩ 5%	½	330792	BTS-18K 5%	
R6	10Meg	½	351452	BTS-10Meg	
R7	4300Ω 5%	½	330642	BTS-4300 5%	
R8	220KΩ 5%	½	331052	BTS-220K 5%	
R9	47KΩ 5%	½	330892	BTS-47K 5%	
R10	10KΩ 5%	½	330732	BTS-10K 5%	
R11	220KΩ 5%	½	331052	BTS-220K 5%	

Note 1: Not used in some versions.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	EMERSON PART No.	IRC PART No.	
R12	470KΩ 5%	½	331132	BTS-470K 5%	
R13	75Ω 5%	2	770222		
R14	470KΩ 5%	½	331132	BTS-470K 5%	
R15	10KΩ 5%	½	330732	BTS-10K 5%	
R16	100Ω	2	780252		
R17	560Ω 5%	10	394145		
R18	56Ω	2	780192		
R19	22Ω	1	370092		
R20	3.3Ω	½	397041		Note 1

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	EMERSON PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T1	4.8KΩ CT	1.8Ω tap@ .8Ω RES	734093						

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	EMERSON PART No.	JENSEN PART No.	QUAM PART No.	
SP1	6"	PM	3.6Ω	180126	ST-110 Mod. P6-V	6A1	① Model 800B uses 3 speakers.
SP2	6"	PM	3.6Ω	180126	ST-110 Mod. P6-V	6A1	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA							REMARKS
	EMERSON PART No.	ASTATIC PART No.		SHURE PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1	960826					47	0-1 or S-1 and 0-3	

ELECTRO-VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENT SEE BELOW.

PHONO NEEDLE

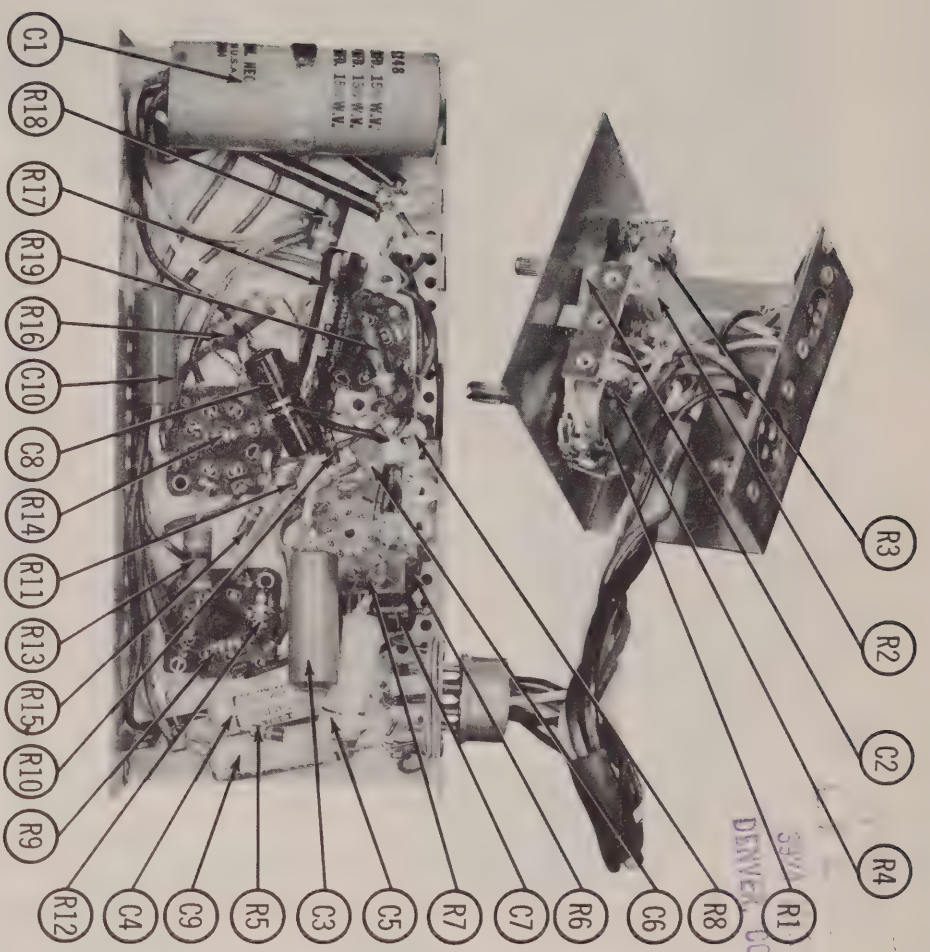
(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA				REMARKS
	EMERSON PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	
M2	960827	†S-66 or ♦†S-66SD	†AC-434 or ♦†AC-434D1 or †♦AC-434D2 or ♦AC-434D	†W-75TPS or ♦†W-75DS or ♦W-75TPD	†Jewel ♦Diamond

MISCELLANEOUS

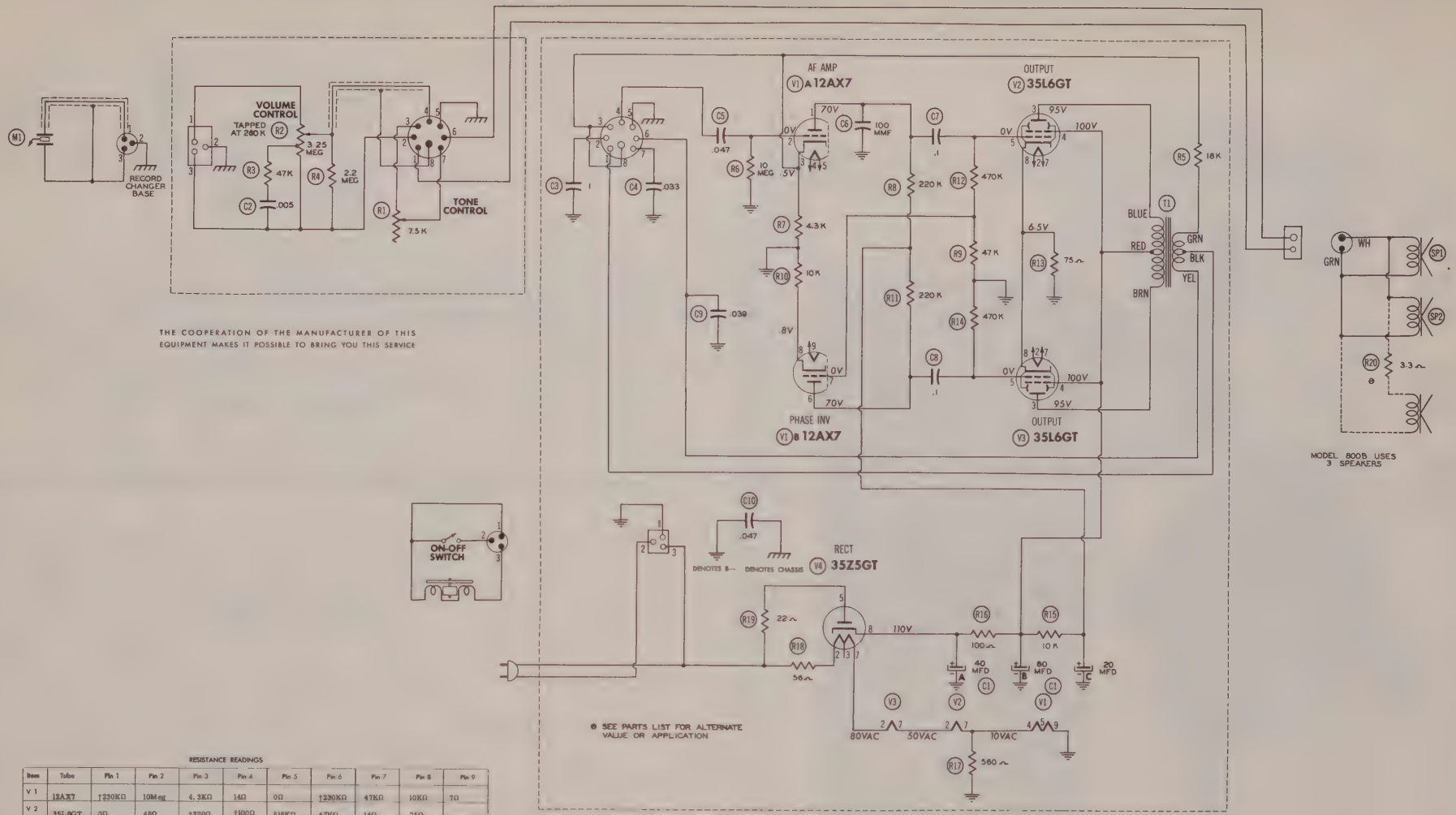
ITEM No.	PART NAME	EMERSON PART No.	NOTES
	Cabinet	140580	Model 800B - Mahogany
	Cabinet	140587	Model 802B - Mahogany
	Cabinet	140580A	Model 800B - Blond
	Cabinet	140587A	Model 802B - Blond
	Knobs	460162A	Volume & Tone

CHASSIS—BOTTOM VIEW



DENVER COLORADO

EMERSON MODEL 800B (Ch. 120159-B)



THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	12AX7	†230KΩ	10Meg	4.3KΩ	14Ω	0Ω	†230KΩ	47KΩ	10KΩ	7Ω
V 2	35L6GT	0Ω	45Ω	†270Ω	†100Ω	515KΩ	47KΩ	14Ω	75Ω	
V 3	35L6GT	0Ω	80Ω	†270Ω	†100Ω	470KΩ	†10KΩ	45Ω	75Ω	
V 4	35Z5GT	105Ω	110Ω	105Ω	†10KΩ	185Ω	0Ω	80Ω	60KΩ	

† MEASURED FROM PIN #8 OF V4.

⊕ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

1. DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt
2. Socket connections are shown as bottom views
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings
6. All controls at minimum, proper output load connected.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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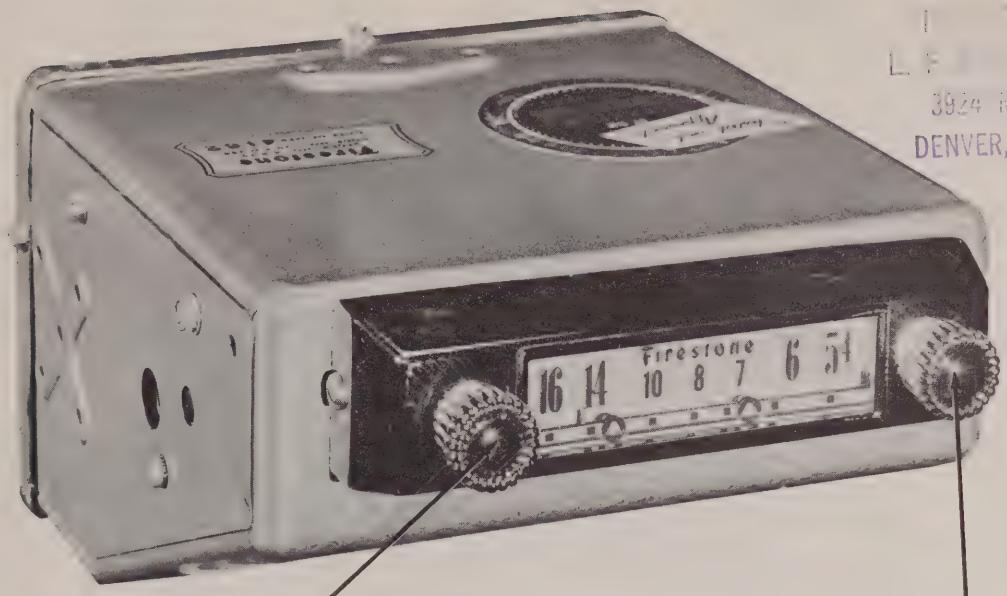
FIRESTONE MODEL 4-B-75

OF
NTHIP
3924 [illegible] ST.
DENVER, COLORADO

FIRESTONE MODEL 4-B-75



FIRESTONE MODEL 4-B-75

TRADE NAME	Firestone Model 4-B-75 (Code 120-4-MU34)
SUPPLIER	Firestone Tire & Rubber Co., 1200 Firestone Pkwy., Akron, Ohio
TYPE SET	Battery Operated Universal Automobile AM Superheterodyne Receiver
TUBES (Six)	Types 6BA6 RF Amp., 6BE6 Conv., 6BA6 IF Amp., 6AV6 Det-AVC-AF Amp., 6AQ5 Output, 6X4 Rectifier
POWER SUPPLY	6 Volt Storage Battery — RATING 5.6 Amp. @ 6.3 Volts DC
TUNING RANGE—BROADCAST	538KC - 1610KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.
Attenuate generator output to maintain approximately 1.8 volts on output meter.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1MFD	High side to pin 7 (grid) of 6BE6 (V2). Low side to chassis.	455KC (400~ Mod.)	Tuning gang fully open.	Across voice coil.	A1, A2 A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2	"	"	1610KC	"	"	A5	"
3	68MMFD	High side to antenna receptacle. Low side to chassis.	1400KC	Tune to 1400KC signal.	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
4	"	"	"	"	"	A7	" With radio installed in car and antenna fully extended, tune in a weak station near 1000KC and adjust A7 (antenna-trimmer) for maximum volume.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

FIRESTONE
MODEL 4-B-75 (Code 120-4-MU34)

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: FIRESTONE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amp.	6BA6	6BA6	7BK	
V2	Converter	6BE6	6BE6	7CH	
V3	IF Amp.	6BA6	6BA6	7BK	
V4	Det-AVC-AF Amp.	6AV6	6AV6	7BT	
V5	Output	6AQ5	6AQ5	7BZ	
V6	Rectifier	6X4	6X4	5BS	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: FIRESTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	■20	350	CE-86	AFH3-107		C080		FP330	TVL-3636	
B	▲20	350								
C	20	25								
C2	.047	200	C503-2	P288-047	DF-503	PJ2S47		PT4147	4TM-S47	
C3	100		CC101	SI100	D6-103	TP34	GP1K-101	UC-531	5GA-T1	
C4	5000	500	C502-4	P488-005	D6-502	CUB4D5	GP2-333-502	PT425	4TM-S5	
C5	.047	200	C503-2	P288-047	DF-503	PJ2S47		PT4147	2TM-S47	
C6	5		CC50	SI5NP0	TCZ-5	Z011	GP1K-050	ZT-555	5TCUB-V5	
C7	40		CC400	SI40	D6-400	TP28	GP1K-400	UC-5439		
C8	200	500	①	1468-0002		5W5T2		MC237	1FM-32	
C9A	220									
B	5000									
C	5000		♦PC-151	♦PA-113-2	♦PC-151	♦116TM2	♦1408-02		♦DT-2	
D	250									
E										
C10	.01	600	C103-6	P688-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	
C11	.47	200	C474-1	P185-5		PJ2P5		RF480	HC-3	
C12	.008	1600	C802-16	P1688-008		CUB16D8		PT1628	MB-D8	

Note 1: Some models may use a 270MMF ⓐ 500V in this application.
♦ Items C9A, C9B, C9C, C9D, C9E, R9A, R9B and R9C are combined in one unit.
When replacing items individually, items C9D and C9E should total 250MMF.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: FIRESTONE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500KΩ	½	RV-34U	Q13-133	A47-500K-Z	B-59-S	U-48	Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWE-12	Not Req.	US-26	Attach to R1A

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: FIRESTONE PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R2	470KΩ	½	R474	BTS-470K	
R3	220Ω	½	R221	BTS-220	
R4	150KΩ	½	R154	BTS-150K	
R5	47KΩ	½	R473	BTS-47K	
R6	820Ω	½	R821	BTS-820	
R7	6800Ω	2	R682-2	BTB-6800	
R8	2.2Meg	½	R225	BTS-2.2Meg	

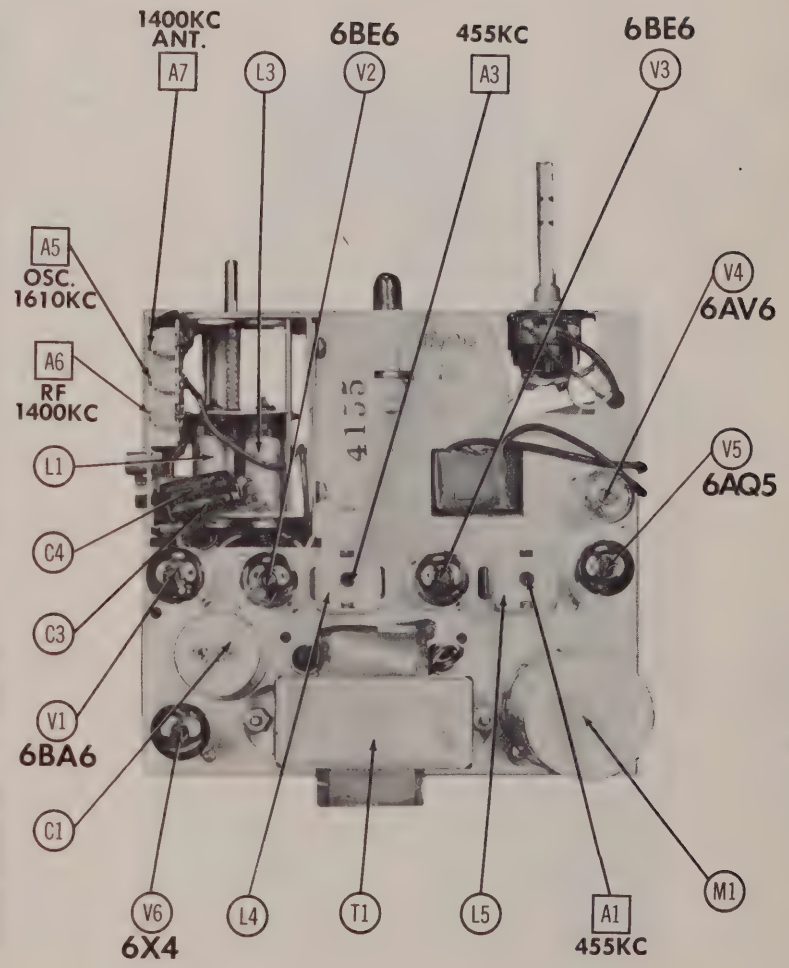
ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: FIRESTONE PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R9A	6.8Meg	½	♦	BTS-6.8Meg	
B	470KΩ	½		BTS-470K	
C	470KΩ	½		BTS-470K	
R10	330Ω	½	R331	BTS-330	
R11	1500Ω	1	R102-1	BTA-1500	Note 1
R12	82Ω	½	R820	BTS-82	
R13	82Ω	½	R820	BTS-82	

♦ Items R9A, R9B, R9C, C9A, C9B, C9C, C9D and C9E are combined in one unit.
Note 1: Some versions may use a 1000Ω resistor in this application.

TRANSFORMER (VIBRATOR)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: FIRESTONE PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	6.3VCT ⓐ 2A	430VCT ⓐ .046ADC			TV-100B		P-2971	V-16K	V3801	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	FIRESTONE PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T2	5.2KΩ	3.5Ω	T0-4502P						

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	FIRESTONE PART No.	JENSEN PART No.	QUAM PART No.	
SP1	5"	PM	3.3Ω	PM-263	ST-105 Mod. P5-X	5A07	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	FIRESTONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	1Ω						Part of tuner
L2	RF Coil	10.5Ω						Part of tuner
L3	Osc. Coil	.4Ω	4.8Ω					Part of tuner
L4	Input IF	14Ω	14Ω	1655-6	16-6758	BC-352	12-C1	
L5	Output IF	15Ω	15Ω	1655-6	16-6758	BC-353	12-C2	
L6	Vib. Hash Choke	0Ω		L202		BC-537	5221	13 Microhenries

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA				NOTES
				FIRESTONE PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	
M1	Interrupter	6.3V	115∿	V-83	5342	859	5342	

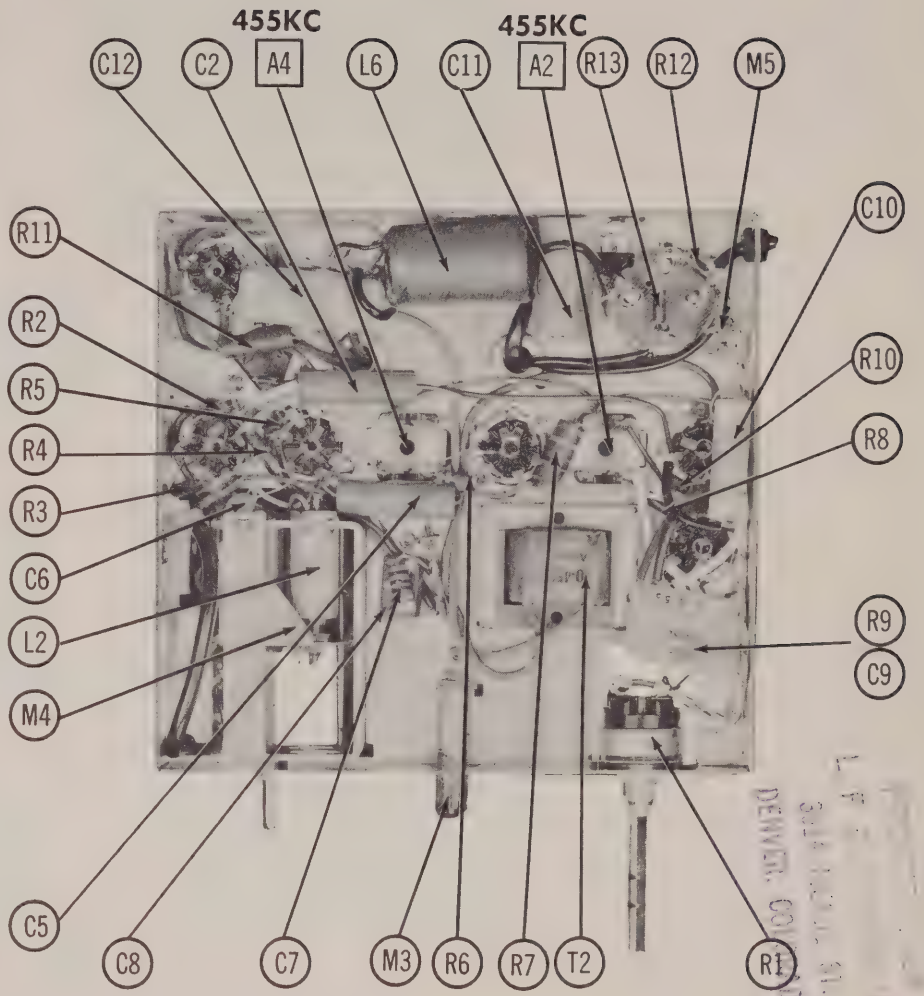
FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			FIRESTONE PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	SFE	14A	A200	FH256	307014 (14A-SFE)	155014	SFE14	HDI

MISCELLANEOUS

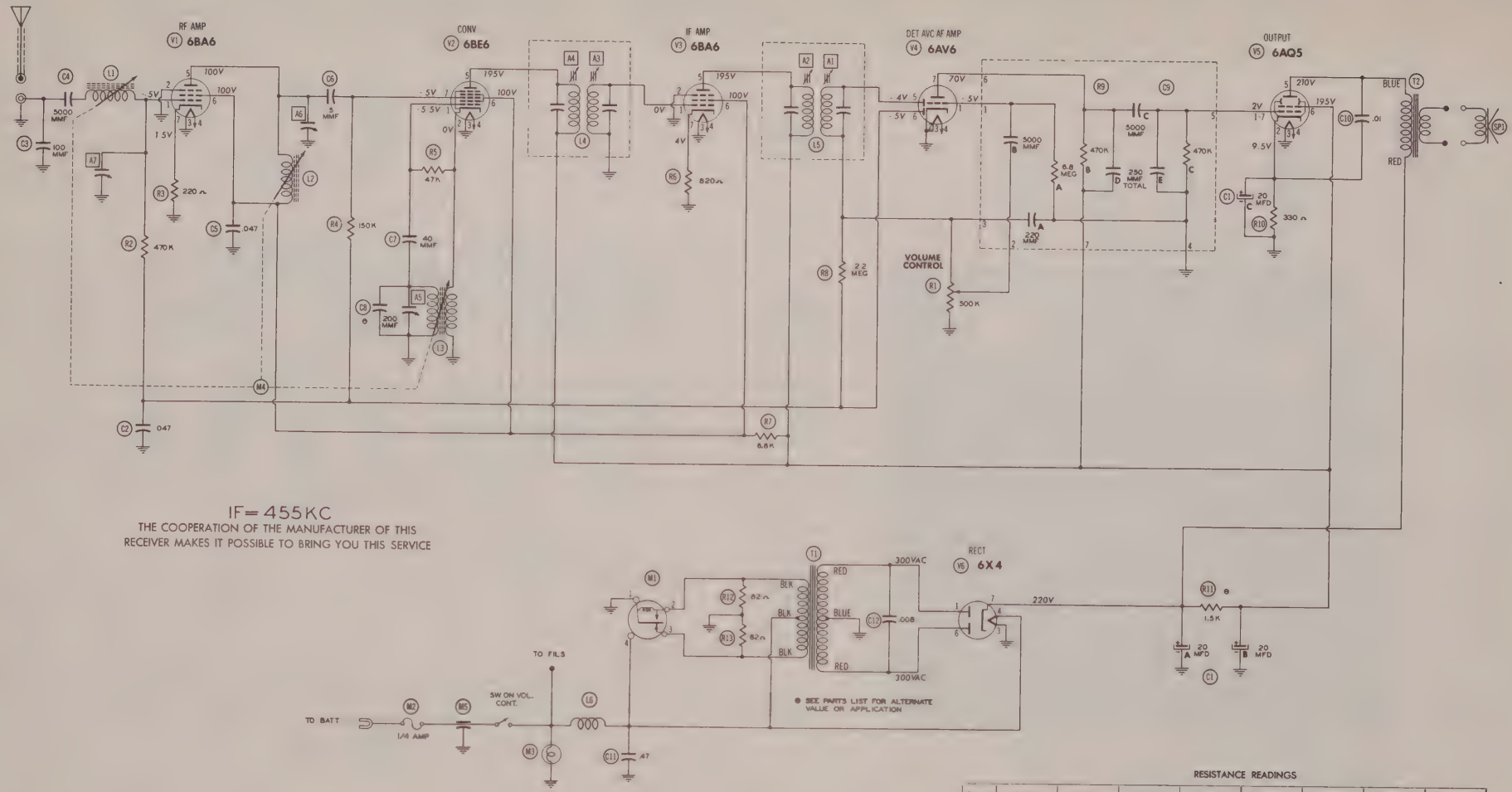
ITEM No.	PART NAME	FIRESTONE PART No.	NOTES
M3	Dial Light	T47	#47, Bayonet
M4	Tuner	PT-555	Permeability; Includes L1, L2, and L3
M5	Spark Plate	CC801	
A5	Trimmer Cap.	CT-161	Osc.
A6	Trimmer Cap.	CT-161	RF
A7	Trimmer Cap.	CT-161	Ant.
	Knob	H38	
	Dial Scale	D-34	
	Pointer	PS-34	

CHASSIS—BOTTOM VIEW



DENVER, COLORADO

FIRESTONE MODEL 4-B-75 (Code 120-4-MU34)



IF = 455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	6BA6	2.7Meg	0Ω	0Ω	.1Ω	†7.8KΩ	†7.8KΩ	220Ω
V 2	6BE6	47KΩ	.8Ω	0Ω	.1Ω	†1KΩ	†7.8KΩ	2.7Meg
V 3	6BA6	.2Ω	0Ω	0Ω	.1Ω	†1KΩ	†7.8KΩ	820Ω
V 4	6AV6	6.8Meg	0Ω	0Ω	.1Ω	500KΩ	2.7Meg	†471KΩ
V 5	6AQ5	470KΩ	330Ω	0Ω	.1Ω	†390Ω	†1KΩ	470KΩ
V 6	6X4	385Ω	INF	.1Ω	0Ω	INF	350Ω	110KΩ

† MEASURED FROM PIN #7 OF V6.

1. DC voltage measurements taken with vacuum tube voltmeter. AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured resistances are from socket pins to common negative.
4. Battery voltage maintained at 6.3 volts for voltage readings.
5. Nominal tolerance on components makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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MASCO MODEL ST-2 (ST-M, ST-R)

PROPERTY OF
L. F. BLANKENSHIP
3924 [illegible] ST.
DENVER, COLORADO

MASCO MODEL
ST-2 (ST-M, ST-R)

MASCO MODEL
ST-2 (ST-M, ST-R)

TRADE NAME	Masco Model ST-2 (ST-M Master & ST-R Remote)
MANUFACTURER	Mark Simpson Mfg. Co., Inc., 32-28 49th. St., Long Island City 3, N.Y.
TYPE SET	AC-DC Operated Intercommunication System
TUBES (Three)	Types 12AT6 AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-DC RATING .19 Amp. @ 117 Volts AC

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1955 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

MASCO MODEL ST-2

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		MASCO PART No.	STANDARD REPLACEMENT		
V1	AF Amplifier	12AT6	12AT6	7BT	
V2	Output	50C5	50C5	7CV	
V3	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	MASCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	40	150		PRS150/40-		BBRT4415C		TCT3116	TVA-3448	
B	40	150		40-20						
C	10	25								
C2	5000			BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C3	5000			BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C4	.022	600		P688-022		CUB6S22		PT6122	6TM-S22	
C5	.1	600		P688-.1	DF-104	CUB6P1		PT601	6TM-P1	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MASCO PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	500KΩ	½	6163925	Q13-133	A47-500K-Z	B-60-S	U-48	Volume
B	Shaft		Not Req.	Not Req.	RS-2	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWE-12	Not Req.	US-26	Attach to R1A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MASCO PART No.	IRC PART No.	
R2	10Meg	½		BTS-10Meg	
R3	470KΩ	½		BTS-470K	
R4	470KΩ	½		BTS-470K	
R5	150Ω	½		BTS-150	
R6	47KΩ	½		BTS-47K	Note 1

Note 1. Not used in some versions.

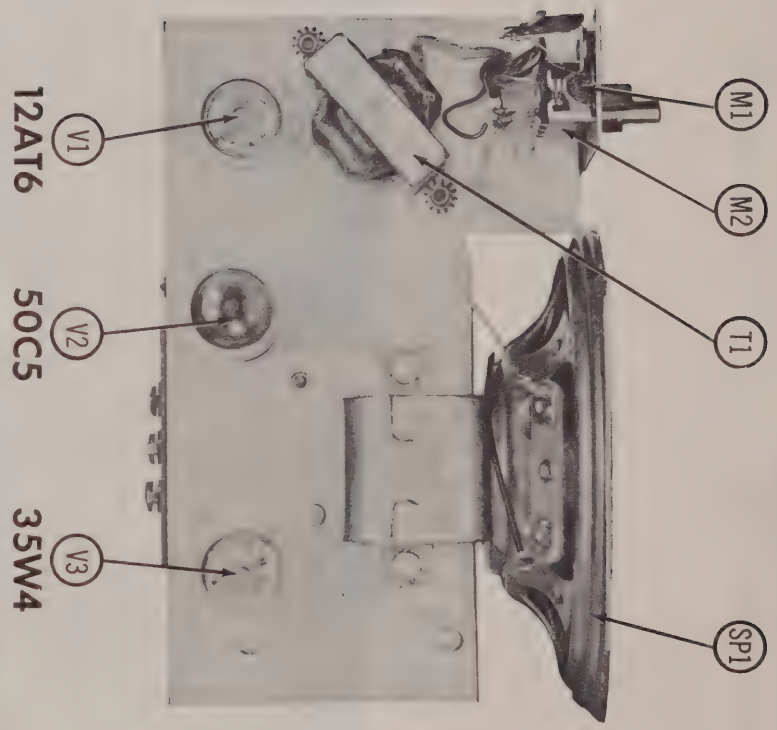
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MASCO PART No.	IRC PART No.	
R7	47KΩ	½		BTS-47K	
R8	10KΩ	½		BTS-10K	
R9	150Ω	½		BTS-150	
R10	280Ω	7			

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	MASCO PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	.53Ω	800Ω					A-2923①	A-77 ①		20A30 ①
	Turns Ratio 1 - 125									

① Drill one new mounting hole.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MASCO PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T2	2.3KΩ	3.3Ω		A-3332	A-3025	S-12X	Z1101	26S58	

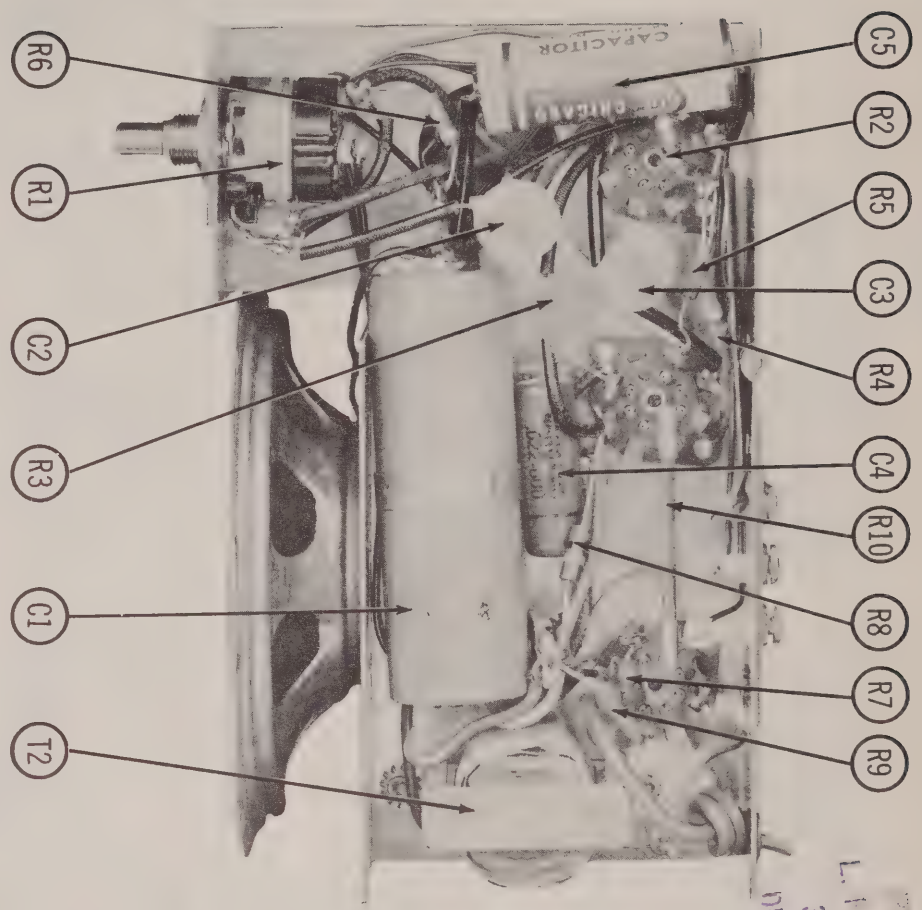
SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	MASCO PART No.	JENSEN PART No.	QUAM PART No.	
SP1	4"	PM	3.3Ω		ST-113 Mod. P4-X	4A1	

MISCELLANEOUS

ITEM No.	PART NAME	MASCO PART No.	NOTES
M1	Neon Bult		NE2
M2	Switch		Talk-Listen

CHASSIS—BOTTOM VIEW



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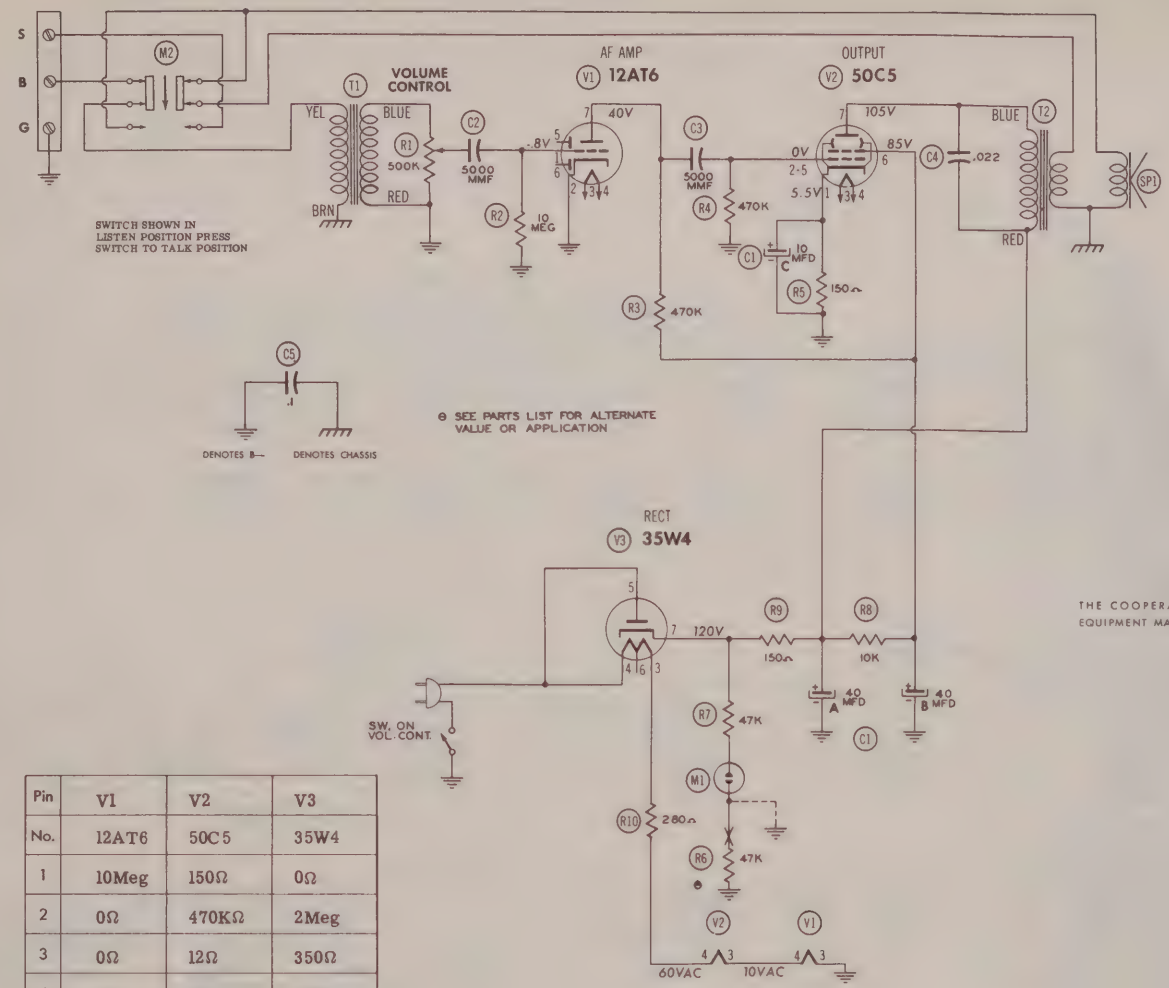
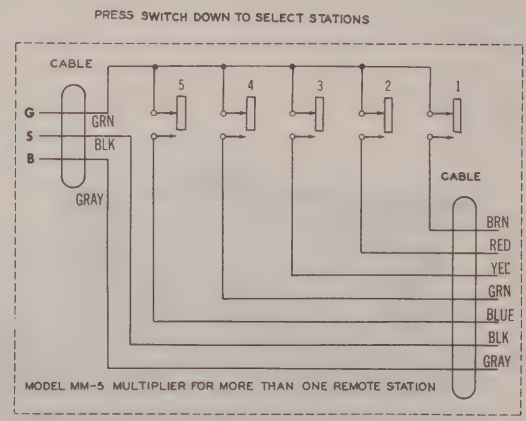
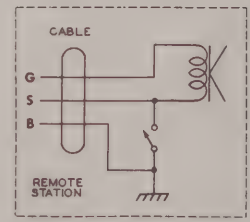
DENVER, COLORADO





THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE



Pin No.	V1 12AT6	V2 50C5	V3 35W4
1	10Meg	150Ω	0Ω
2	0Ω	470KΩ	2Meg
3	0Ω	12Ω	350Ω
4	12Ω	62Ω	380Ω
5	INF	470KΩ	380Ω
6	INF	†10.1KΩ	380Ω
7	†480KΩ	†400Ω	2Meg

† MEASURED FROM PIN 7 OF V3.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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DENVER, COLORADO

TRADE NAME	Mitchell Model 1287
MANUFACTURER	Mitchell Mfg. Co., 2525 Clybourn Ave., Chicago 14, Ill.
TYPE SET	Three Power Portable 2 Band AM Superheterodyne Receiver
TUBES (Five)	Types 1U4 RF Amp., 1L6 Conv., 1U4 IF Amp., 1U5 Det.-AVC-AF Amp., 3V4 Output
POWER SUPPLY	110-120 Volts AC-DC (or) 9 Volts "A" Supply & 90 Volts "B" Supply In Pack Form
RATING	.14 Amp. @ 117 Volts AC (or) 50MA @ 9 Volts DC & 11.5MA @ 90 Volts DC
TUNING RANGE—BROADCAST	540-1620KC SHORT WAVE 5.8MC - 18.3MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use battery power, if possible. If AC power is used, use an isolation transformer when available. If not, connect a .1MFD capacitor in series with low side of the signal generator and B-.
With tuning gang fully closed set dial pointer to coincide with left edge of dial scale.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 6 (grid) of 1L6 (V2). Low side to B-.	455KC (400~Mod)	BC	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If AC power is used without an isolation transformer, reduce dummy antenna to 200MMF to reduce hum modulation.
2.	"	"	18.4MC (400~Mod)	SW	"	"	A5	Pre-set A6 and A7 near maximum capacity . Adjust A5 for maximum output (use peak obtained when A5 is farthest counter clockwise). Check for image freq. by increasing generator output and tuning generator to 19.3MC. If signal fails to appear, return generator to 18.4MC. Turn A5 clockwise until signal is received. Recheck for image.
3.		Loop	15MC	"	Tune to 15MC signal	"	A6, A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. Check for image by tuning generator to 15.9MC.
4.		"	6.5MC	"	Tune to 6.5MC signal	"		Sensitivity check point only.
5.		"	1620KC	BC	Tuning gang fully open	"	A8	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
6.		"	1400KC	"	Tune to 1400KC signal	"	A9, A10	"
7.		"	600KC	"	Tune to 600KC signal	"	A11	Adjust for maximum output while rocking tuning gang, thru 600KC signal. Repeat steps 5, 6 and 7..

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		MITCHELL PART No.	STANDARD REPLACEMENT		
V1	RF Amplifier	1U4	1U4	6AR	
V2	Converter	1L6	1L6	7DC	
V3	IF Amplifier	1U4	1U4	6AR	
V4	Det.-AVC-AF Amp.	1U5	1U5	6BW	
V5	Output	3V4	3V4	6BX	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	MITCHELL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	▲50	150	R-1095	AFH4-31		D026				
B	■40	150								
C	▲40	150								
D	100	15								
C2	3		R-1104	SI3NP0	TCZ-3	TZ06	NP0K-030	ZT-553	5TCCB-V3	
C3	10		N-9048	SI10NP0	TCZ-10	TZ09	NP0K-100	ZT-541	5TCC-Q1	
C4	22		①	SI22NP0	TCZ-22	TZ14	NP0K-220	ZT-5422	5TCC-Q22	
C5	10000		N-9062	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C6	100		N-6015	SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C7	10000		N-9062	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C8	10000		N-9062	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C9	10000		N-9062	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C10	5000		N06272	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C11	10		N-9048	SI10NP0	TCZ-10	TZ09	NP0K-100	ZT-541	5TCC-Q1	
C12	22		①	SI22NP0	TCZ-22	TZ14	NP0K-220	ZT-5422	5TCC-Q22	
C13	.33		R-1154							
C14	50		N-6375	SI50	D6-500	TP30	GP1K-500	UC-545	5GA-Q5	
C15	4000	500	N-1690	1464-402		IR5D4		MCB463	MS-24	
C16	575	500	R-1106							
C17	10000		N-9062 ②	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C18	10000		N-9062	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C19	.1	200	N-1351	P288-1	DF-104	CUB2P1		PT401	4TM-P1	
C20	10000		N-9062	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C21	2000		R-1105	BPD-002	DD-202	K072	801-002	DC-522	5HK-D2	
C22	.1	200	N-1351	P288-1	DF-104	CUB2P1		PT401	2TM-P1	
C23	.05	200	N-1345	P288-05	DF-503	CUB2S5		PT415	2TM-S5	
C24A	150					TP36	GP2K-151	UC-5315		
B	2000					K072	801-002	DC-522		
C	150		♦R-1119	♦PA-136	♦PC-165	TP36	GP2K-151	UC-5315	♦DP-1	
D	10000					K082	811-01	DC-511		
E	5000					K080	811-005	DC-525		
C25	2000		R-1105	BPD-002	DD-202	K072	801-002	DC-522	5HK-D2	
C26	2000		R-1105	BPD-002	DD-202	K072	801-002	DC-522	5HK-D2	
C27	.05	400	N-1346	P488-05	DF-503	CUB4S5		PT415	4TM-S5	
C28	.1	200	N-1351	P288-1	DF-104	CUB2P1		PT401	2TM-P1	
C29	2000		R-1105	BPD-002	DD-202	K072	801-002	DC-522	5HK-D2	

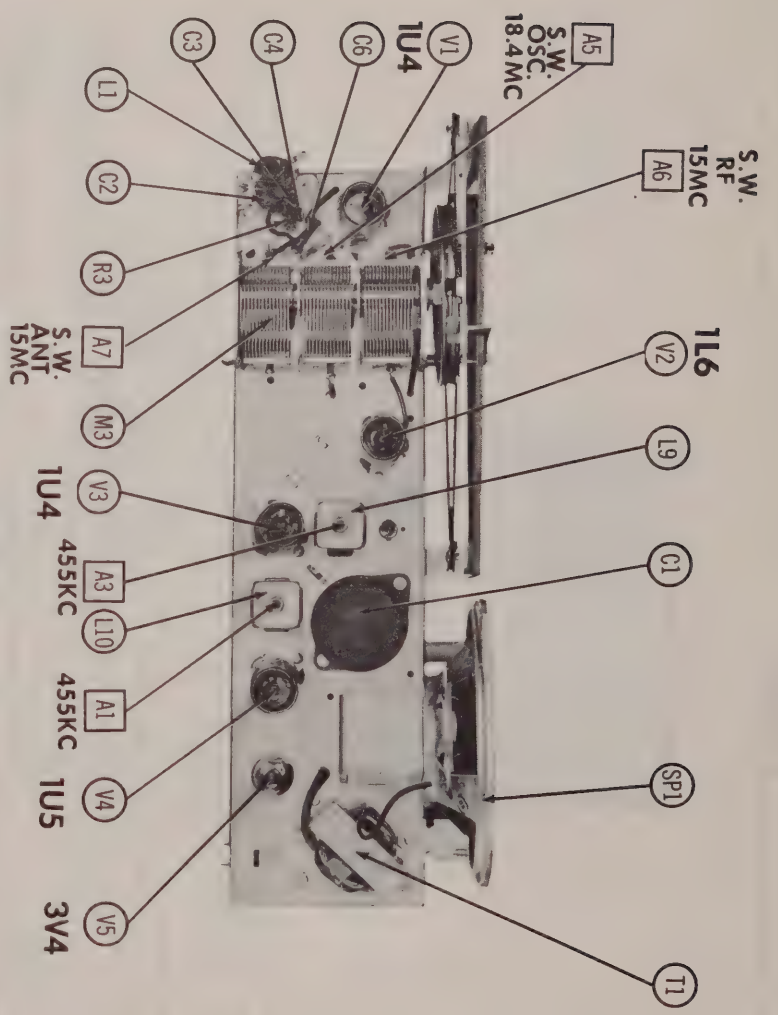
① Not used in all versions.
② Some versions use 5000MMF in this application (part #N-6272).
♦ Items C24A, C24B, C24C, C24D, C24E, R14A, R14B, R14C, R14D are combined in one unit.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MITCHELL PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	1Meg	½	R-1081	Q13-137	A47-1Meg-Z	BSK-70-S	U-53	Volume - Note
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-2	SWE-20	Not Req.	US-27	Attach to R1A
R2A	2Meg	½	R-1082	Q13-139	A47-2Meg-Z	AB-76	U-55	Tone
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R2A

Note. Connect a 47KΩ resistor in series with the left hand terminal of the control and the lead connecting to the original terminal of the control (control viewed from shaft end, terminals down).

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA MITCHELL PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R3	47KΩ	½		BTS-47K	Note 1
R4	2.7Meg	½	N-8027	BTS-2.7Meg	
R5	3.3Meg	½	R-1109	BTS-3.3Meg	
R6	1000Ω	½	N-1694	BTS-1000	
R7	27KΩ	½	N-4451	BTS-27K	
R8	1000Ω	½	N-3341	BTS-1000	
R9	180KΩ	½	N-7003	BTS-180K	
R10	68KΩ	½	N-5693	BTS-68K	
R11	6.8Meg	½	N-4028	BTS-6.8Meg	
R12	1500Ω	½	N-7398	BTS-1500	
R13	1Meg	½	N-1262	BTS-1Meg	
R14A	10Meg	½		BTS-10Meg	
B	4.7Meg	½	♦R-1119	BTS-4.7Meg	
C	1Meg	½		BTS-1Meg	
D	3.3Meg	½		BTS-3.3Meg	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA MITCHELL PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R15	1500Ω	½	N-7398	BTS-1500	
R16	220Ω	½	N-5348	BTS-220	
R17	1800Ω	½	N-4281	BTS-1800	
R18	3300Ω	3	R-1151		
R19	4700Ω	2	N-7018	BTB-4700	
R20	470Ω	1	N-4421	BTA-470	
R21	82Ω	½	N-5857	BTS-82	
R22	100Ω	2.5	R-1152		
R23	47KΩ	½		BTS-47K	Note 1

Note 1. Not used in all versions.
♦ Items R14A, R14B, R14C, R14D, C24A, C24B, C24C, C24D and C24E are combined in one unit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA MITCHELL PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T1	8KΩ	3.3Ω	R-1080	A-8114	A-2927 ①	S-7X	Z1115	24S52	① Drill one new mounting hole.

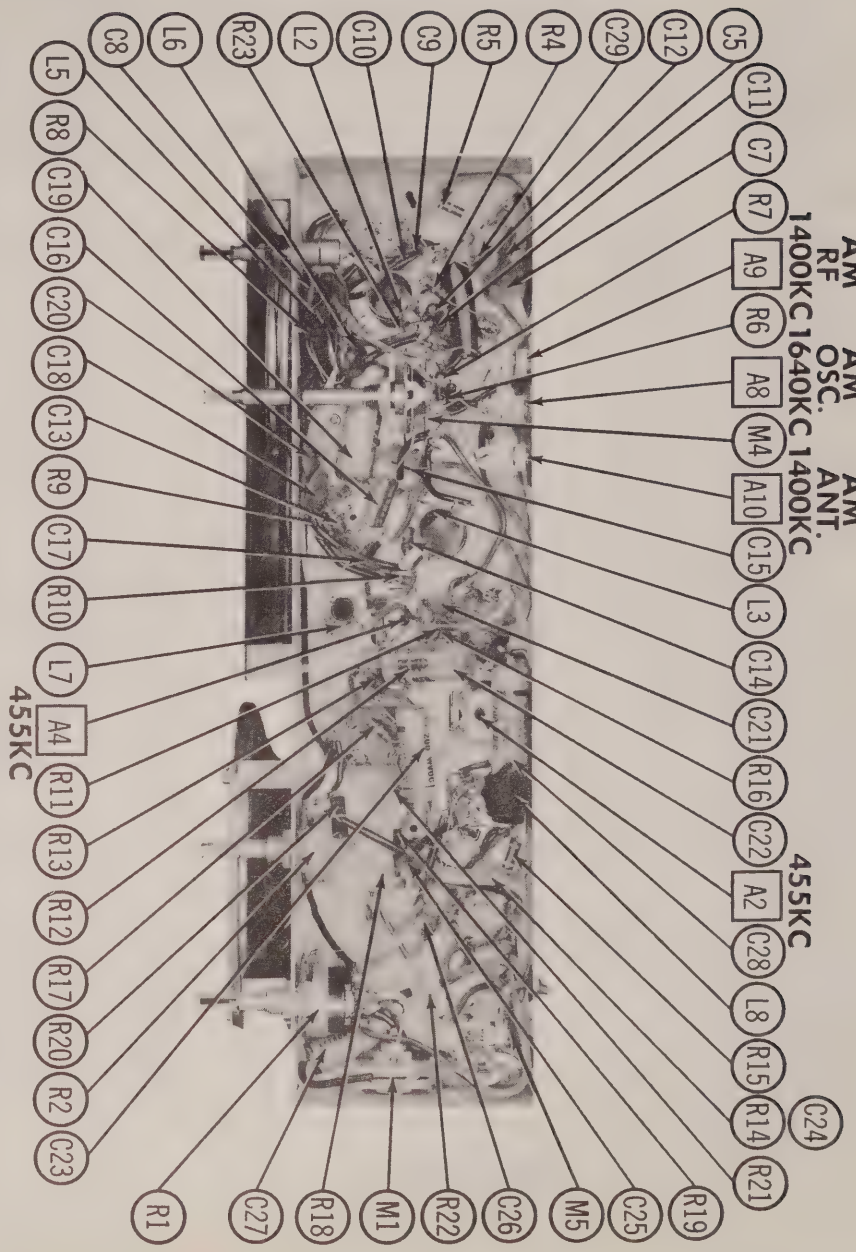
SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA MITCHELL PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1	5"	PM	3.3Ω	R-1116	ST-105 Mod. P5-X	5A1	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA MITCHELL PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	SW Ant. Coil	6Ω	.1Ω	R-1097				
L2	SW RF Coil	.9Ω	0Ω	R-1098				
L3	SW Osc. Coil	0Ω	.6Ω	R-1099				
L4	AM Loop Ant.	2Ω		R-1086				Includes cabinet back
L5	Fil. Choke	0Ω		R-1172	19-1000		4602	1 Microhenry
L6	AM RF Coil	8.5Ω		R-1101	19-3180	TV-184	6154	
L7	AM Osc. Coil	.8Ω	3Ω	R-1102	14-1074	BC-381	70-Osc.	
L8	RF Choke	0Ω		R-1160	19-1000	TV-189	4602	1 Microhenry
L9	Input IF	14Ω	14Ω	N-7981	16-6758	BC-352	12-C1	
L10	Output IF	14Ω	14Ω	N-7981	16-6758	BC-353	12-C2	

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SELENIUM RECTIFIER

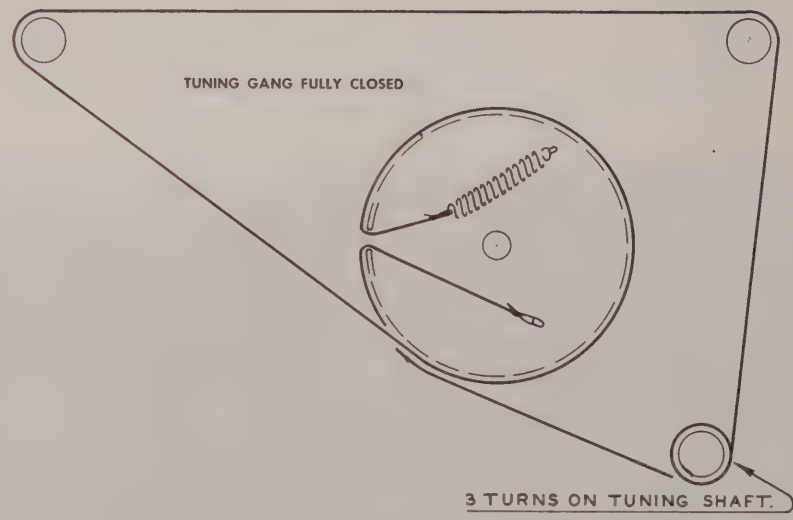
ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	MITCHELL PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	SELETRON PART No.	
M1	.064A	N-8331	1002A	RS65	6S65	65	8J1	

BATTERIES

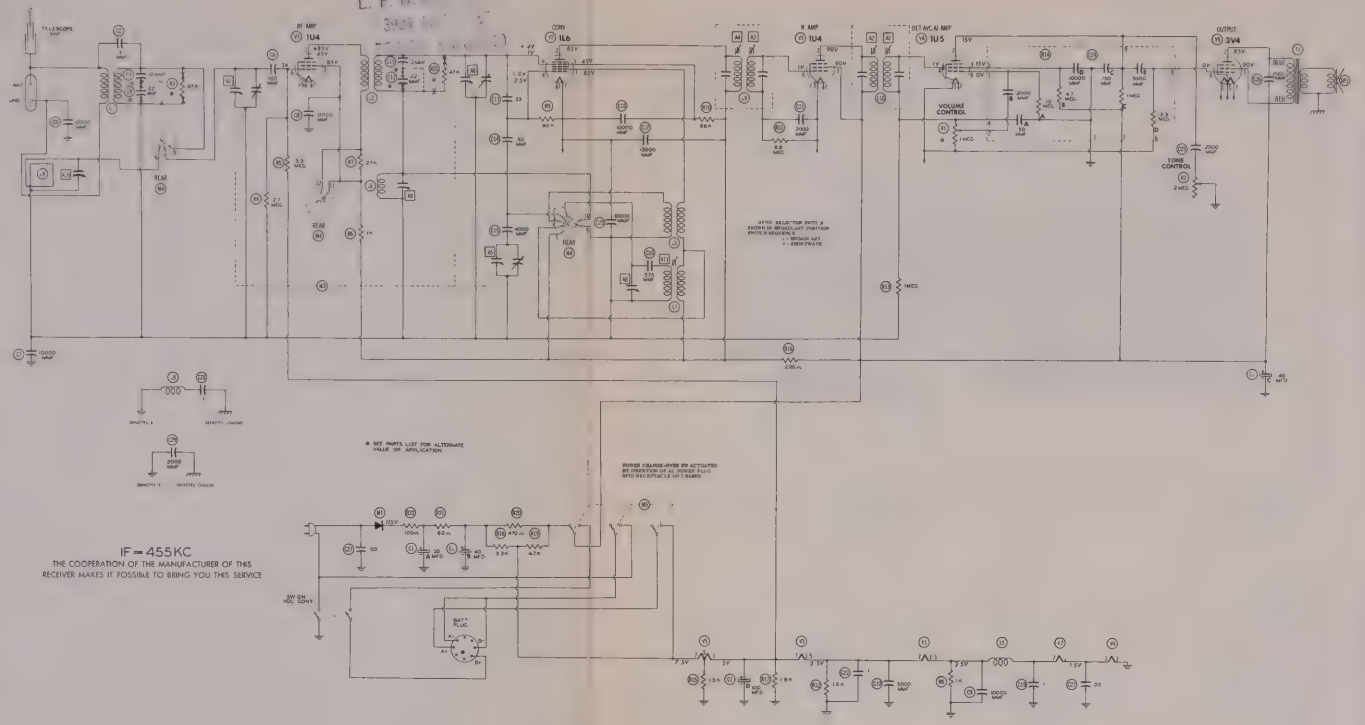
ITEM No.	VOLTAGE	MITCHELL PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
M2	9V "A" 90V "B"				753			F6A60	

MISCELLANEOUS

ITEM No.	PART NAME	MITCHELL PART No.	NOTES
M3	Tuning Cap.	R-1083	15-435MMF, 15-435MMF, 15-435MMF
M4	Switch	R-1049	Band
M5	Switch	R-1103	Change-over
A8,A9			
A10	Trimmer	R-1083	3 Section
	Telescopic Ant.	R-1120	



DIAL CORD STRINGING



* SEE PARTS LIST FOR ALTERNATE VALUE ON APPLICATION

IF = 455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1U4	*	†4.4KΩ 57KΩ	†1.9KΩ	INF	*	3.3Meg	*
V 2	1L6	*	†900Ω	†900Ω	18KΩ	†700KΩ	1.8Meg	*
V 3	1U4	*	†880Ω	†810Ω	INF	*	8.8Meg	*
V 4	1U5	*	†900KΩ	†4.7Meg	1.2Meg	*	10Meg	*
V 5	3V4	*	†1.2KΩ	†950Ω	INF	*	3.3Meg	*

ALL READINGS IN "BROADCAST" POSITION UNLESS NOTED.
* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.
† MEASURED FROM OUTPUT OF M1
# MEASURED IN "SW" POSITION

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OLDSMOBILE
MODEL 983090

TRADE NAME	Oldsmobile Model 983090 (For 1954 Oldsmobile Autos)
MANUFACTURER	Oldsmobile Motors, Div. Of General Motors Corp., Lansing, Mich.
TYPE SET	Battery Operated Custom Built Automobile AM Superheterodyne Receiver
TUBES (Seven)	Types 12BA6 RF Amp., 12BE6 Conv., 12BA6 IF Amp., 12BF6 Det-AVC-AF Amp., (2) 12V6GT Output, 0Z4 Rectifier
POWER SUPPLY	12 Volt Storage Battery — RATING 2.3 Amp. @ 12.6 Volts DC
TUNING RANGE—BROADCAST	540 - 1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1MFD	High side to pin 7 (grid) of 12BE6 (V2). Low side to chassis.	262KC (400~ Mod.)	High frequency end stop.	Across voice coil.	A1, A2 A3, A4	Adjust for maximum output.
2	68MMFD	High side to antenna receptacle. Low side to chassis.	1615KC	"	"	A5, A6 A7	Check mechanical setting of oscillator core (A8). The core should be positioned so that the slotted end is 1 25/32" from mounting end of coil form. If core requires adjustment, dissolve seal on core stud., make adjustment and reseal core stud. Adjust A5, A6 and A7 in order given for maximum output.
3	"	"	1000KC	Tune to 1000KC signal.	"	A9, A10	Adjust for maximum output.
4	"	"	1615KC	High frequency end stop.	"	A6, A7	Adjust for maximum output.
5	"	"	1000KC	Tune to 1000KC signal.	"		With dial pointer adjustment screw set dial pointer to the first "O" of "100" on dial scale.
6	With radio installed in car and antenna fully extended, tune in a weak station between 600KC and 1000KC and adjust A7 for maximum volume.						

PUSH BUTTON ALIGNMENT

Press push button to the right and pull all the way out.
Tune manually to the desired station, then press push button all the way in.
Repeat procedure for remaining push buttons.

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		Oldsmobile PART No.	STANDARD REPLACEMENT		
V1	RF Amplifier	12BA6	12BA6	7BK	
V2	Converter	12BE6	12BE6	7CH	
V3	IF Amplifier	12BA6	12BA6	7BK	
V4	Det.-AVC-AF Amp	12BF6	12BF6	7BT	
V5	Output	12V6GT	12V6GT	7S	
V6	Output	12V6GT	12V6GT	7S	
V7	Rectifier	0Z4	0Z4	4R	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

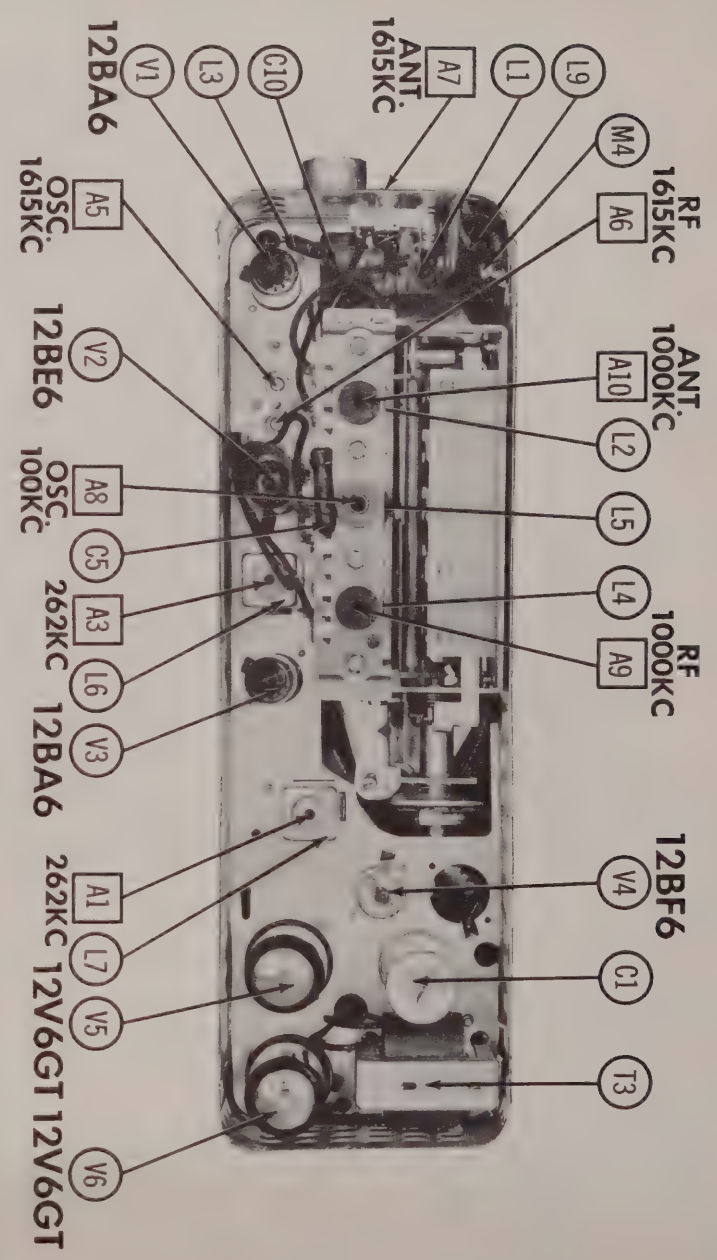
ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	Oldsmobile PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	■20	400	M-908	AFH3-120		C099		FP345.8	TVL-3678	
B	▲20	400								
C	20	25								
C2	.05	200	6512	P288-05	DF-503	CUB2S5		PT415	2TM-S5	
C3	15	500	①	1468-150	D6-150	5W5Q15	GP1K-150	UC-5415	1FM-415	
C4	39	500	G-390	1469-390	TCZ-39	22R5Q39	NP0K-390	MCB223	MS-44	
C5	180		7257424							
C6	.05	400	6512	P488-05	DF-503	CUB4S5		PT415	4TM-S5	
C7	100	500	G-100	1468-101	D6-101	5W5T1	GP1K-101	MC235	1FM-31	
C8	.002	600	6528	P688-002	D6-202	CUB6D2	GP2-333-202	PT622	6TM-D2	
C9	220	500	G-221	1468-221	D6-221	5W5T22	GP2K-221	MC240	1FM-325	
C10	.005	400		P688-005	D6-502	CUB6D5	GP2-333-502	PT625	6TM-D5	
C11	.01	400	6510	P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C12	.01	400	6510	P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C13	.1	400	6513	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C14	100		G-101	BPD-101	D6-101	G042	801-101	UC-531	5GA-T1	
C15	.003	1000	H-302	P1088-003	DD16-302	CUB16D3		PT1623	MB-D3	
C16	.007	1600	H-702	P1688-007		CUB16D7		PT1627	MB-D7	
C17	.47	100	7257906	P185-5		MP2P5		RF480	68P20	
C18	.5	100	6592	P185-5		MP2P5		RF480	68P20	

① Some versions use 10MMF in this application (part #G-100).

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Oldsmobile PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	2Meg	½	7264242			F1-52	UF26A	Tone - Panel
B	300KΩ					R2-38	UR354-T74	Volume -Tapped ⓐ 70KΩ-Rear
C	Bushing					AK-27	EB-214	Attach to R1A
D	Switch					KB-1	US-26T	Attach to R1B

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Oldsmobile PART No.	IRC PART No.	
R2	2.2Meg	½	A-225	BTS-2.2Meg	
R3	68Ω	½	1215558	BTS-68	
R4	10KΩ	1	B-103	BTA-10K	
R5	330KΩ	½	A-334	BTS-330K	
R6	22KΩ	½	A-223	BTS-22K	
R7	1Meg	½	A-105	BTS-1Meg	
R8	15KΩ	2	C-153	BTB-15K	
R9	220Ω	½	A-221	BTS-220	
R10	1Meg	½	A-105	BTS-1Meg	
R11	47KΩ	½	A-473	BTS-47K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Oldsmobile PART No.	IRC PART No.	
R12	1Meg	½	A-105	BTS-1Meg	
R13	1000Ω	½	A-102	BTS-1000	
R14	2200Ω	½	A-222	BTS-2200	
R15	820KΩ	½	1214561	BTS-820K	
R16	47KΩ	½	A-473	BTS-47K	
R17	27KΩ	1	B-273	BTA-27K	
R18	360Ω	1	7234563	BTA-360	
R19	1800Ω	2	C-182	BTB-1800	
R20	15KΩ	1	B-153	BTA-15K	

TRANSFORMER (VIBRATOR)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	Oldsmobile PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	12.6VCT @2.4A	384VCT .062ADC			6067					

TRANSFORMER (INPUT)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	Oldsmobile PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T2	1.8KΩCT (DC Res.)				6061					

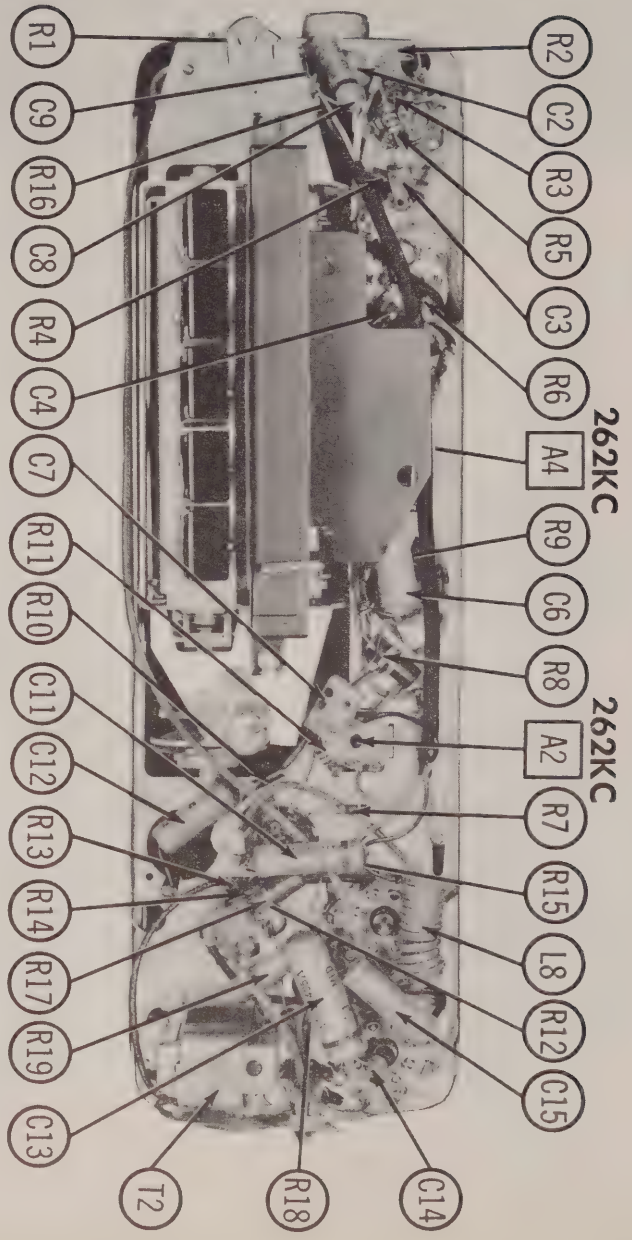
TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	Oldsmobile PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T3	7.8KΩ	3.9Ω	6063	A-3852	A-2936	S-15X	Z1002	22S87	

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	Oldsmobile PART No.	JENSEN PART No.	QUAM PART No.	
SP1	8"	PM	3.9Ω	7263090	ST-115 Mod. P8-V	8A21	

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	Oldsmobile PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coupling Coil	.7Ω		7255738	19-1004		4610	
L2	Ant. Coil	10Ω		7258914				
L3	Ant. Coupling Coil	5Ω		7240251	19-6022		4626	
L4	RF Coil	10Ω		7258914				
L5	Osc. Coil	1.2Ω	4.4Ω	7263071				
L6	Input IF	35Ω	35Ω	1219508	16-6752	BC-350	12-H1	
L7	Output IF	30Ω	30Ω	1218726	16-6754	BC-354	12-H6	
L8	Fil. Choke	0Ω		1217846	19-1001		4604	
L9	Fil. Choke	0Ω		1217846	19-1001		4604	
L10	Vibrator Hash Choke	0Ω		7264693			5221	

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FRE-QUENCY	REPLACEMENT DATA				NOTES
				Oldsmobile PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	
M1	Interrupter	12.6V	115∿	8550	6330	G-874	6330	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			Oldsmobile PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	7AG	7½A/ 32V	7263227		30307.5 (7.5A-7AG)		AGW 7½	

PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS

ITEM No.	PART NAME	Oldsmobile PART No.	NOTES
M3	Dial Light		#57, Bayonet
M4	Spark Plate	1212278	
A5,A6	Trimmer Cap.	7242454	Dual - RF & Osc.
A7	Trimmer Cap.	7262997	Ant.
	Knob	7259818	On-off-volume and tuning
	Knob	7260192	Tone
	Knob	7260192	Dummy
	Pointer Backplate	7264425	
	Dial	7264240	
	Dial Backplate	7264556	
	Pushbutton & Slide Assy.	1220274	

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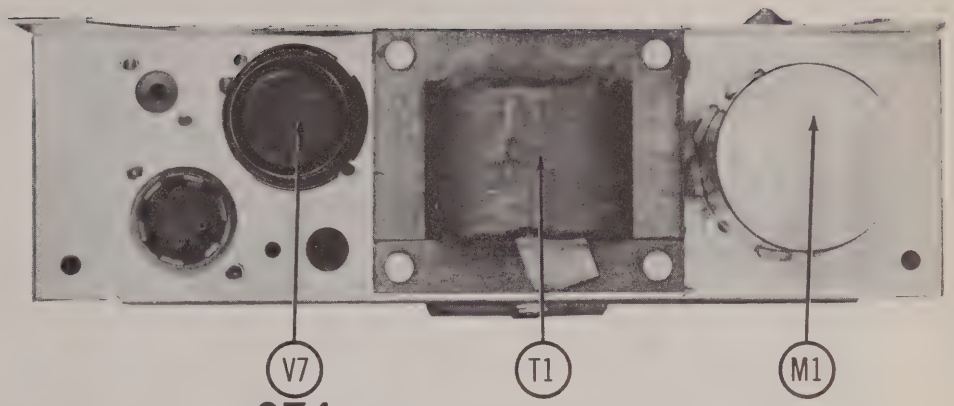

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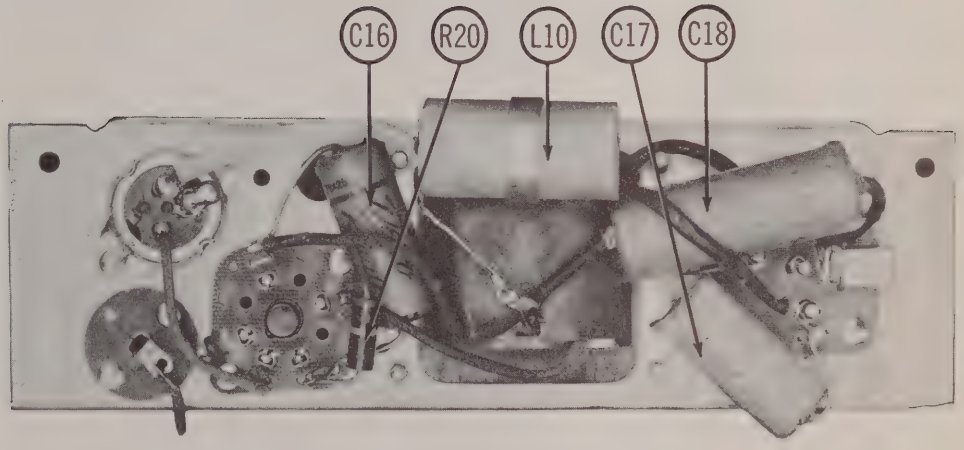

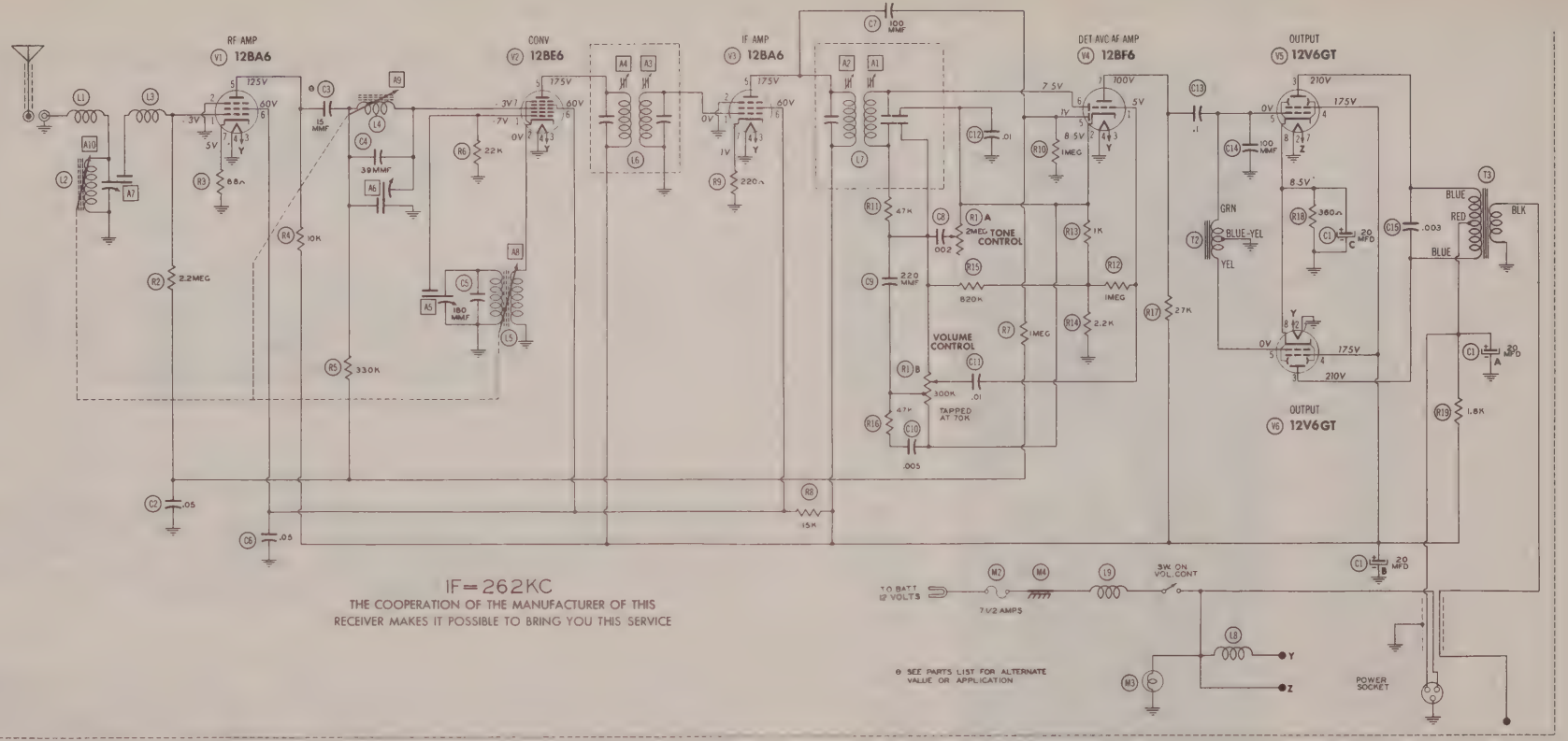

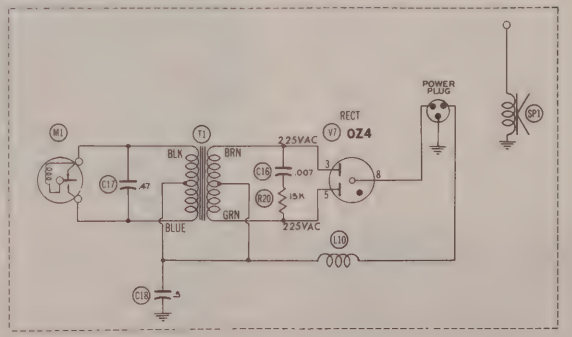

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	12BA6	4.2Meg	0Ω	.1Ω	0Ω	†12KΩ	†17KΩ	68Ω	
V 2	12BE6	22KΩ	1.2Ω	.1Ω	0Ω	†1.8KΩ	†17KΩ	2.3Meg	
V 3	12BA6	40Ω	0Ω	.1Ω	0Ω	†1.8KΩ	†17KΩ	220Ω	
V 4	12BF6	1Meg	3.2KΩ	.1Ω	0Ω	1Meg	300KΩ	†29KΩ	
V 5	12V6GT	INF	0Ω	†210Ω	†1.8KΩ	1.1KΩ	3.2KΩ	.1Ω	360Ω
V 6	12V6GT	INF	.1Ω	†210Ω	†1.8KΩ	1.1KΩ	.2Ω	0Ω	360Ω
V 7	0Z4	0Ω	INF	250Ω	INF	370Ω	INF	15KΩ	160KΩ

† MEASURED FROM PIN 8 OF V7

1. DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Battery voltage maintained at 12 Volts for voltage readings.
5. Nominal tolerance on components values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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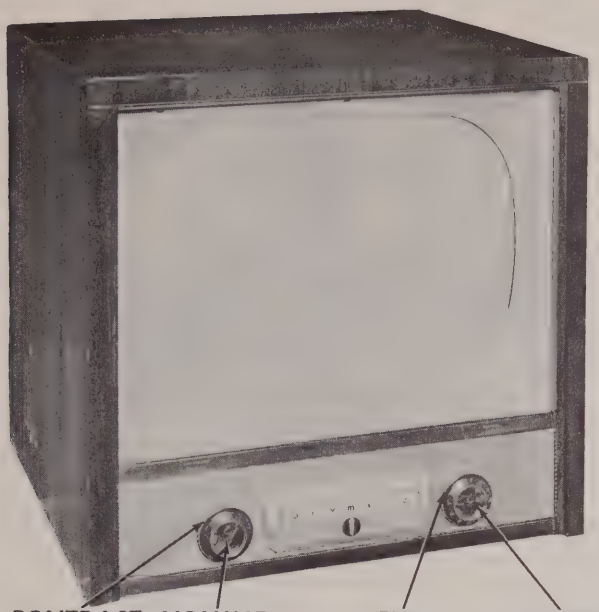

OLYMPIC MODEL 21TU14

TRADE NAME	Olympic	MODELS	CHASSIS
		17CR20, 17TR10, 17TR19	"R"
		21CS12, 21CS18, 21KS22, 21TS11, 21TS17	"S"
		21CU15, 21CU16, 21TU14	"U"
MANUFACTURER	Olympic Radio & Televison, Inc., 34-01 38th. Ave., Long Island City 1, N.Y.		
TYPE SET	Television Receiver		
TUBES	Nineteen		
POWER SUPPLY	110-120 Volts AC-60 Cycles	RATING 1.42 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13, Video IF 26.25MC, Sound IF 21.75MC (Intercarrier)		

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OLYMPIC MODELS 17CR20, 17TR10, 17TR19, 21CS12, 21CS18, 21CU15, 21CU16, 21KS22, 21TS11, 21TS17, 21TU14 (Ch. R, S, U)

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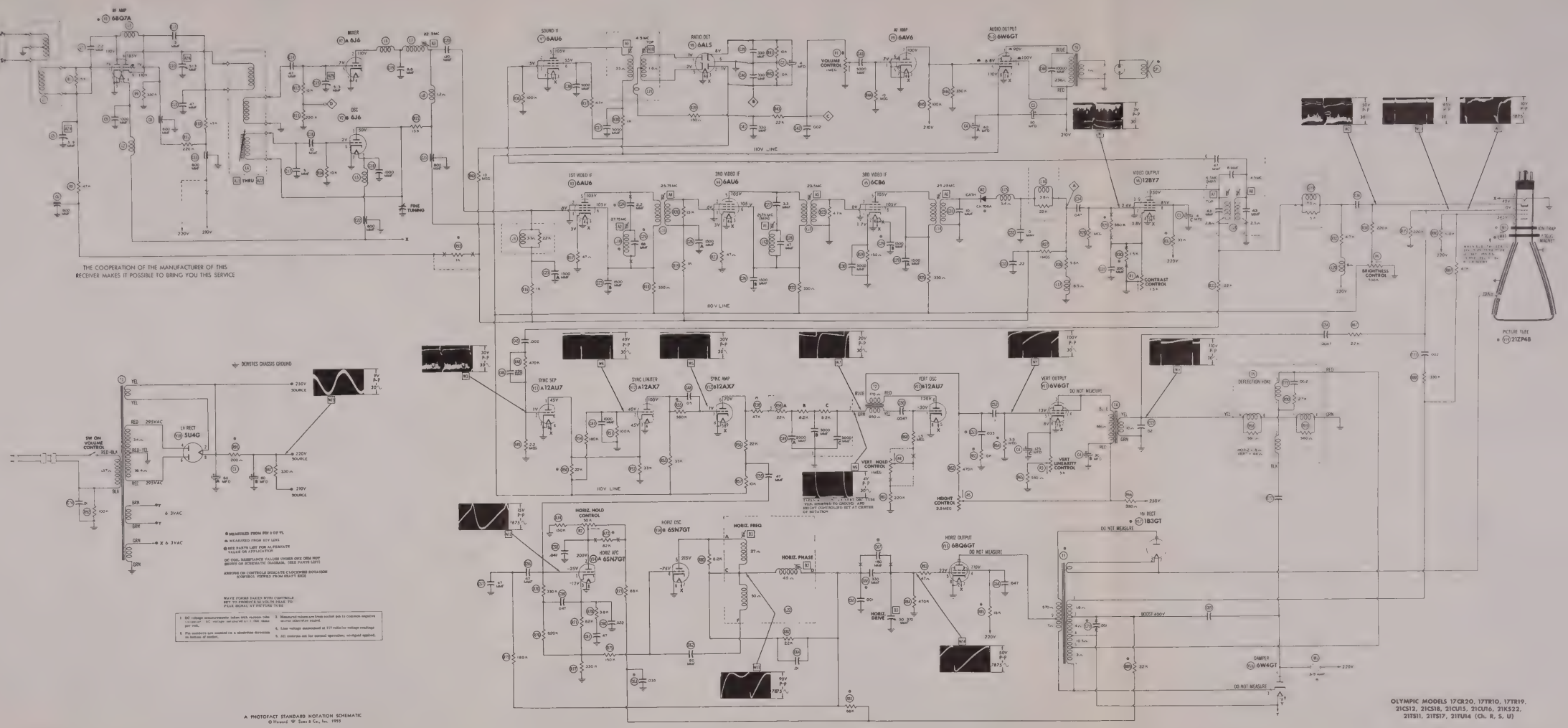
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
DENOTES CHASSIS GROUND
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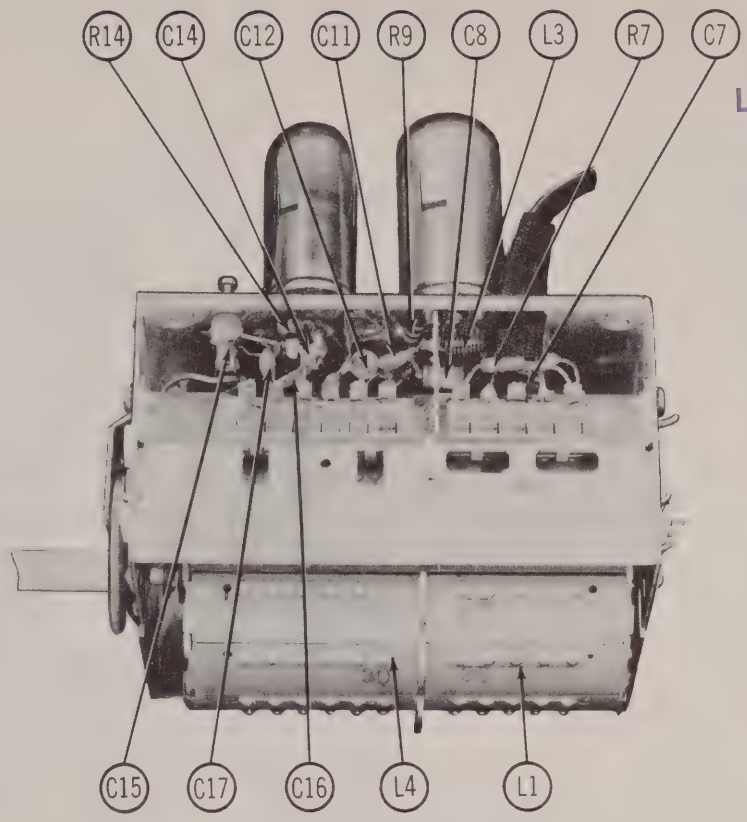
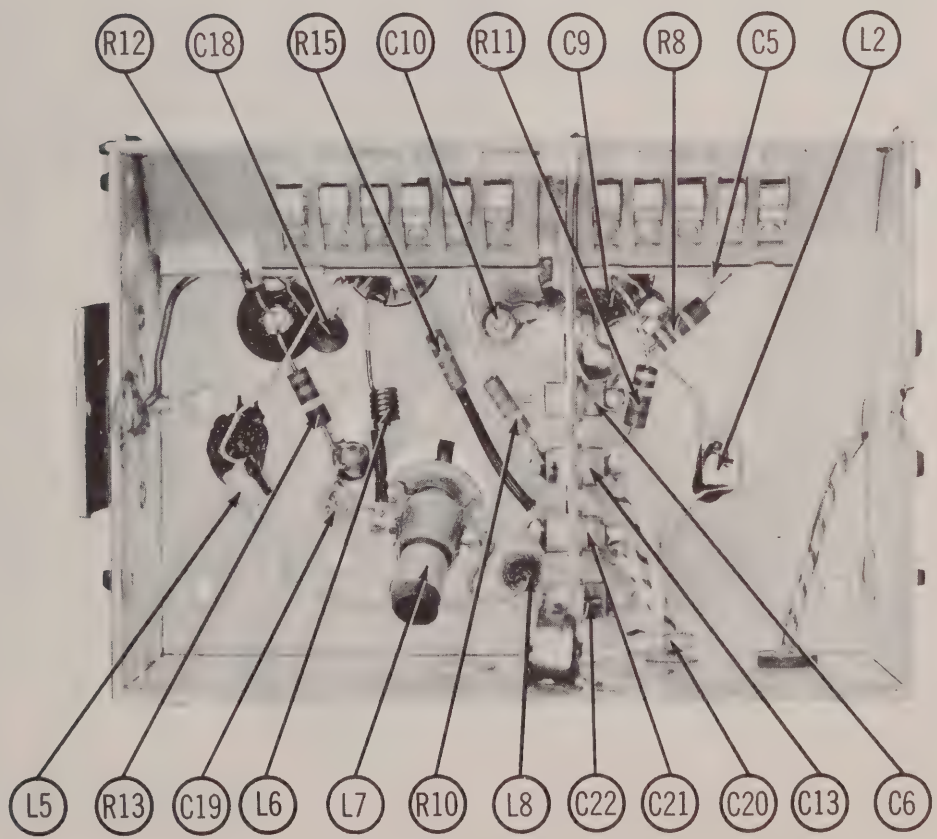
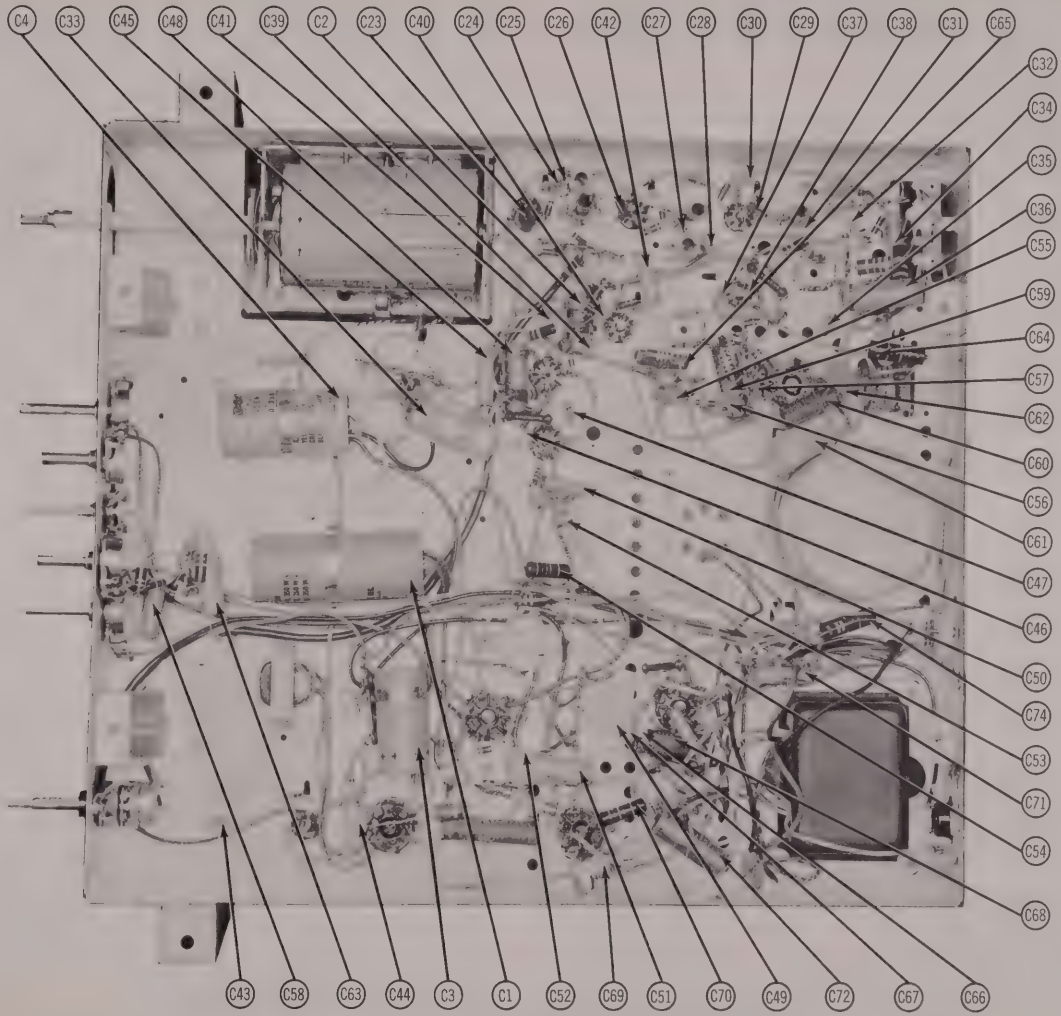


CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

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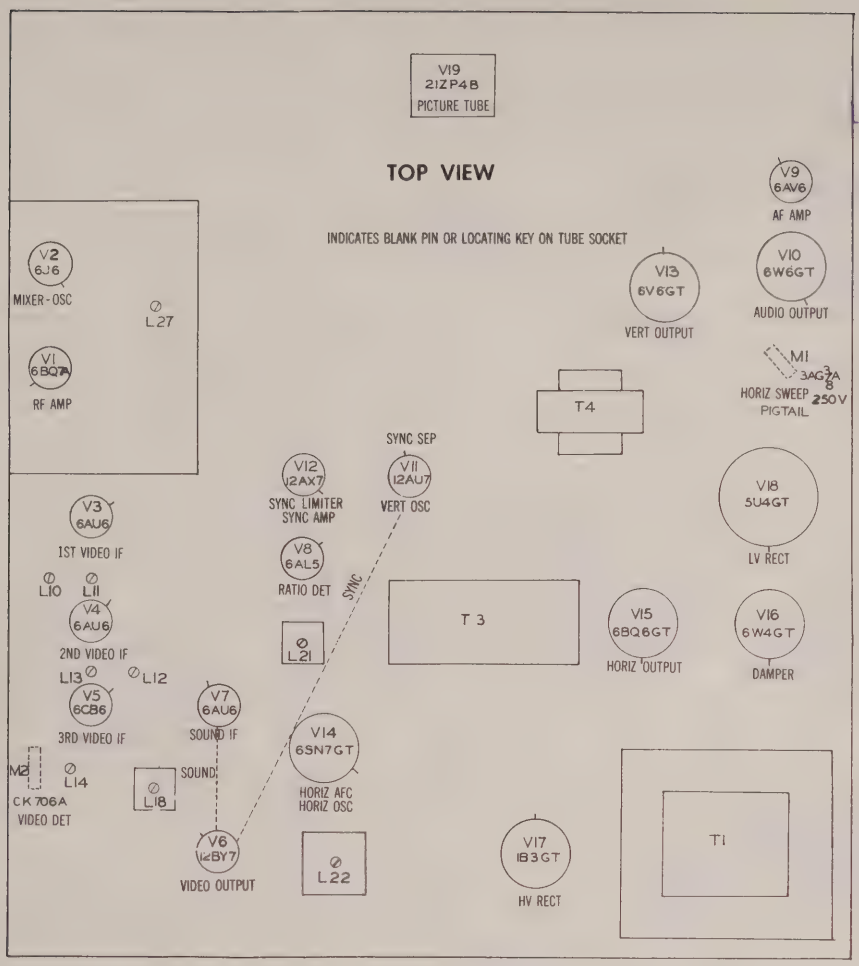
OLYMPIC MODELS 17CR20, 17TR10, 17TR19, 21CS12, 21CS18, 21CU15, 21CU16, 21KS22, 21T311, 21T317, 21TU14 (CN, R, S, U).

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **V18**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V6, V10**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V6, V19**
Has pic, no sound - **V7, V8, V9, V10**

SYNC FAILURE
No vert. sync - **V11, V12**
No horiz. sync - **V12, V14**
No vert. or horiz. sync - **V11, V12**

SWEEP FAILURE
No raster, has sound - **V14, V15, V16, V17, V19, Fuse (M1)**
No vertical deflection - **V11, V13**
Poor vert. linearity or foldover - **V11, V13**
Poor horiz. linearity or foldover - **V14, V15, V16**
Narrow picture - **V14, V15, V16, V17, V18**
Vert. off freq. - **V11, V12**
Horiz. off freq. - **V12, V14**

OLYMPIC MODELS 17CR20, 17TR10, 17TR19, 21CS12, 21CS18, 21CU15, 21CU16, 21KS22, 21TS11, 21TS17, 21TU14 (Ch. R, S, U)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from the chassis. Do not remove the horizontal oscillator (V14) to disable the high voltage.

VIDEO IF ALIGNMENT

Remove the converter tube (V2) from its socket and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications.
Use lowest DC scale on VTVM.
If oscillation occurs during alignment (varying signal generator output will have no effect on VTVM reading) detune A6 and adjust A3, A4 and A5 as in steps 3, 4 and 5, then adjust A6 as in step 6.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	21.75MC (Unmod)	Any	DC probe thru 100KΩ to point (A). Common to chassis.	A1	Adjust for MINIMUM deflection.
2.	"	"	27.75MC	"	"	A2	Adjust for MINIMUM deflection (used in 21 "U" models only.
3.	"	"	22.5MC	"	"	A3	Adjust for maximum deflection.
4.	"	"	25.75MC	"	"	A4	"
5.	"	"	23.5MC	"	"	A5	"
6.	"	"	25.25MC	"	"	A6	"

OVERALL VIDEO IF RESPONSE CHECK

Connect the negative lead of a 1.5 volt bias battery to the ungrounded side of C33. Connect the positive lead to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	24MC (10MC Swp)	21.75MC 23.0MC 26.25MC 27.75MC	Any	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.		Check for response curve similar to Fig.1. If necessary, SLIGHTLY retouch A3, A5 and A6. A6 positions 26.25MC marker. Adjust A3 and A5 to position 23MC marker. If necessary, increase sweep generator output and use high scope gain to view trap regions. Adjust A1 and A2 to place 21.75MC and 27.75MC markers in center of trap notches as in Fig. 1. Remove 1.5 volt bias battery.

4.5MC TRAP ALIGNMENT

Set contrast control fully clockwise.
Remove V5 (6CB6) from its socket.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
8.	.01MFD	High side to point (A). Low side to chassis.	4.5MC (Unmod)	Any	DC probe thru detector (Fig.2) to pin 11 (cathode) of picture tube. Common to chassis.	A7	Adjust for MINIMUM deflection. Use maximum signal generator output. Replace V5 in its socket.

ALTERNATE 4.5MC TRAP ALIGNMENT

Tune in any local TV station. Adjust fine tuning control to emphasize 4.5MC beat interference in picture. Adjust A7 to minimize the 4.5MC beat in the picture.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Remove V5 (6CB6) from its socket.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
9.	.01MFD	High side to point (A). Low side to chassis.	4.5MC (Unmod)	Any	DC probe to point (B). Common to chassis.	A8, A9	Adjust for maximum deflection.
10.	"	"	"	"	DC probe to point (C). Common to chassis.	A10	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Replace V5 in its socket.

SOUND IF ALIGNMENT USING TV SIGNAL AND VTVM

Tune in any local TV station.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
9.	Not used	Not used	Not used	Any local station	DC probe to point (B). Common to chassis.	A8, A9	Adjust for maximum deflection (use 30VDC scale).
10.	"	"	"	"	DC probe to point (C). Common to chassis.	A10	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. (Use 3VDC scale.)

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.
Remove V5 (6CB6) from its socket.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9	.01MFD	High side to point (A). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. amp. to point (B). Low side to chassis.	A8, A9	Disconnect stabilizing capacitor C2. Adjust for curve of maximum amplitude and symmetry similar to Fig. 3.
10	"	"	"	"	"	Vert. amp. to point (C). Low side to chassis.	A10	Reconnect stabilizing capacitor C2. Adjust so that 4.5MC occurs at center of cross-over lines as in Fig. 4. SLIGHTLY retouch A9 for maximum amplitude and straightness of crossover lines. Replace V5 in its socket.

ALIGNMENT INSTRUCTIONS (cont)

OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket.
Connect bias battery as in "Overall Video IF Response Check".
The channel oscillator adjustment screws are reached through a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
11	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. amp. thru 10KΩ to point (A). Low side to chassis.	A11	Adjust to place sound marker in trap notch as in Fig. 5. Video marker should be at 50%.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A12	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A13	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A14	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A15	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A16	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A17	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A18	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A19	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A20	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A21	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A22	

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RF AND MIXER ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. amp. thru 10KΩ to point (D). Low side to chassis.	A23, A24 A25	Adjust for response curve similar to Fig. 6 with markers above 90%.
13	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check for response curve similar to Fig. 6. If markers fall below 70% on any channel, make compromise adjustments of A23, A24 and A25 with channel switch set to that channel. Recheck all other channels to see that they have not been seriously affected.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

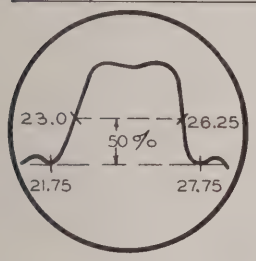


FIG. 1

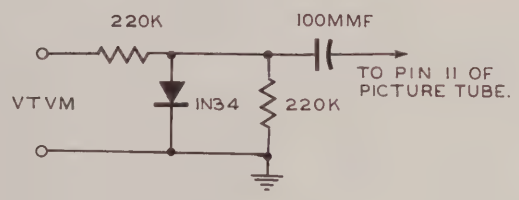


FIG. 2

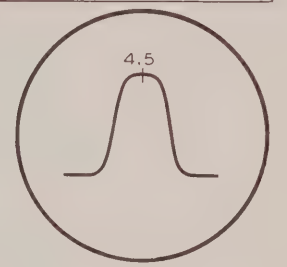


FIG. 3

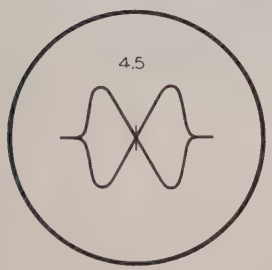


FIG. 4

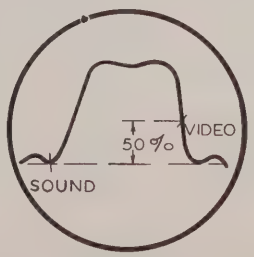


FIG. 5

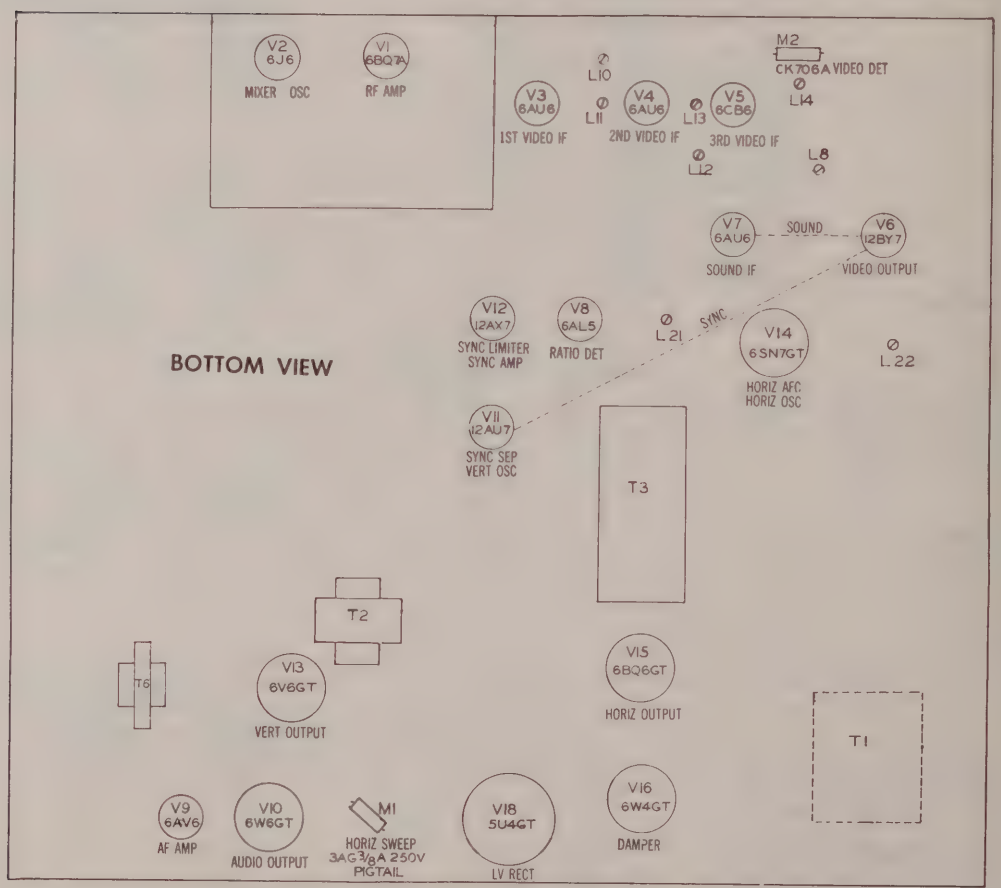
FIG. 6

OLYMPIC MODELS 17CR20, 17TR10, 17TR19, 21CS12, 21CS18, 21CU15, 21CU16, 21KS22, 21TS11, 21TS17, 21TU14 (Ch. R, S, U)

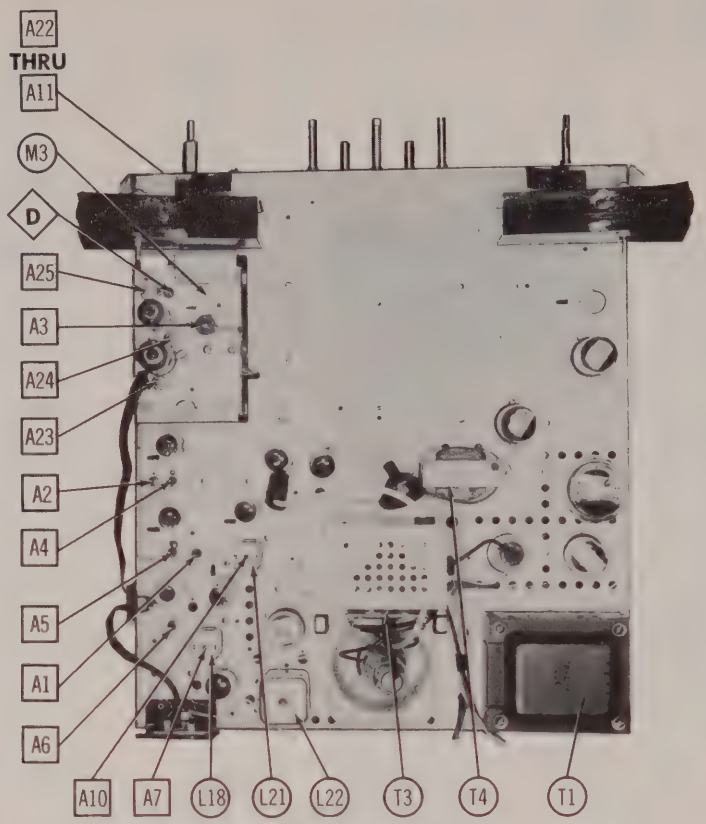
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7A	INF	1.1Meg	0Ω	.1Ω	0Ω	†2KΩ	†150KΩ	INF	0Ω
V 2	6J6	■15KΩ	■2.3Ω	.1Ω	0Ω	230KΩ	10KΩ	0Ω		
V 3	6AU6	1Meg	0Ω	.1Ω	0Ω	■330Ω	■330Ω	47Ω		
V 4	6AU6	1Meg	0Ω	.1Ω	0Ω	■330Ω	■330Ω	47Ω		
V 5	6CB6	.3Ω	150Ω	.1Ω	0Ω	■330Ω	■330Ω	0Ω		
V 6	12BY7	220Ω	450KΩ	0Ω	0Ω	0Ω	.1Ω	†5KΩ	†33KΩ	0Ω
V 7	6AU6	100KΩ	0Ω	.1Ω	0Ω	■1KΩ	■47KΩ	0Ω		
V 8	6AL5	10KΩ	10KΩ	.1Ω	0Ω	1Meg	0Ω	1Meg		
V 9	6AV6	10Meg	0Ω	.1Ω	0Ω	0Ω	0Ω	†100KΩ		
V 10	6W6GT	0Ω	0Ω	†850Ω	†600Ω	†100KΩ	INF	.1Ω	50KΩ	
V 11	12AU7	■18KΩ	2.2Meg	0Ω	.1Ω	.1Ω	†1.3Meg	2.2Meg	0Ω	0Ω
V 12	12AX7	■33KΩ	■80KΩ	33KΩ	0Ω	0Ω	■32KΩ	■600KΩ	0Ω	.1Ω
V 13	6V6GT	†330Ω	.1Ω	†1KΩ	†1KΩ	3.9Meg	10KΩ	0Ω	600Ω	
V 14	6SN7GT	1.6Meg	▲100KΩ	450KΩ	500KΩ	▲90KΩ	0Ω	.1Ω	0Ω	
V 15	6BQ6GT	0Ω	0Ω	▲47KΩ	†18KΩ	470KΩ	470KΩ	.1Ω	0Ω	TOP CAP ▲17Ω
V 16	6W4GT	INF	INF	100KΩ	INF	†200Ω	INF	100KΩ	100KΩ	
V 17	1B3GT		PINS	1 - 8	HAVE	INF	RESISTANCE			TOP CAP ▲587Ω
V 18	5U4G	INF	70KΩ	▲18Ω	34Ω	†200Ω	36Ω	INF	70KΩ	
V 19	21ZP4B	0Ω	220KΩ	PIN 10 ▲47KΩ	PIN 11 ■380KΩ	PIN 12 .1Ω				

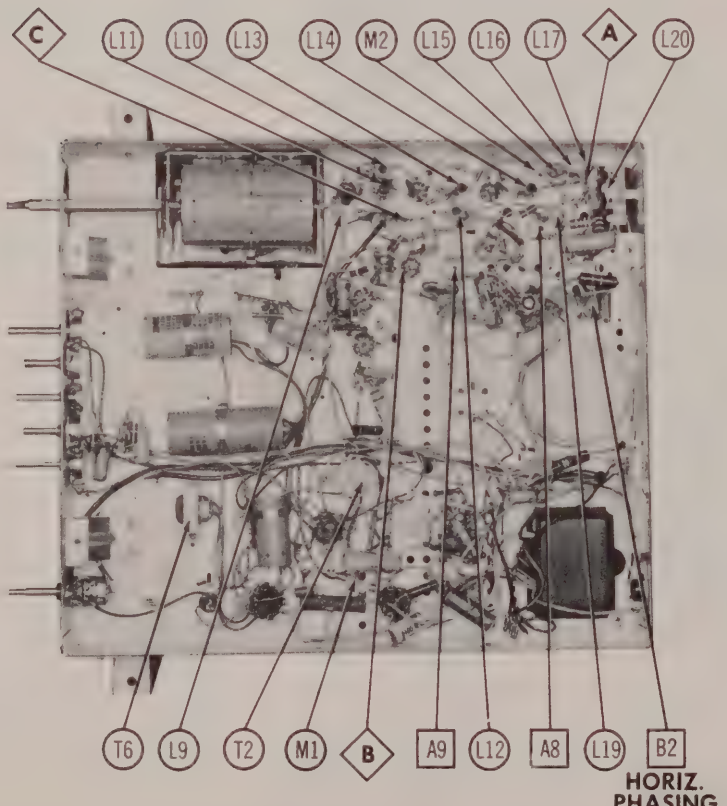
† MEASURED FROM PIN 8 OF V18.
■ MEASURED FROM 110V LINE.
▲ MEASURED FROM PIN 3 OF V16.



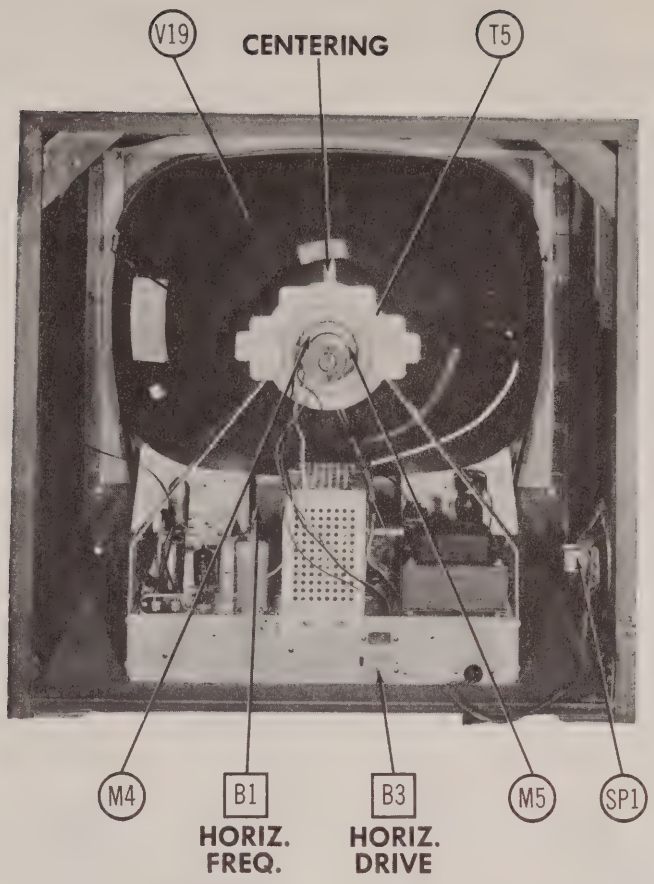
TUBE PLACEMENT CHART



RF TUNER-RIGHT SIDE



RF TUNER-BOTTOM VIEW



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CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Connect a short jumper from terminal "C" to terminal "D" of L22.

Set the horizontal hold control fully clockwise. Adjust the horizontal frequency slug (B1) until the picture falls into sync.

Remove the jumper from terminals "C" and "D" of L22. Connect the high side of vertical amplifier of scope thru 5MMF to terminal "C" of L22.

Adjust the horizontal phasing slug (B2) for a waveform similar to Fig. 7 with broad and narrow peaks of equal height.

If necessary, during adjustment of B2, keep picture in sync with horizontal hold control or B1.

Remove scope and retouch B1 for the following conditions:

1. At full clockwise position of horizontal hold control a blanking bar or picture jitter should be evident.
2. At full counter clockwise position of horizontal hold control, picture should lose sync with $4\frac{1}{2}$ to 5 diagonal bars sloping downward to the left. If picture remains in sync at either extreme setting of horizontal hold control switch off channel and back again so that picture falls out of sync.

Adjust the horizontal drive trimmer (B3) counter clockwise as far as possible without the presence of vertical white lines or compression near the center of the picture. If neither of these indications appear adjust B3 for a picture slightly wider than necessary to fill the picture mask horizontally.

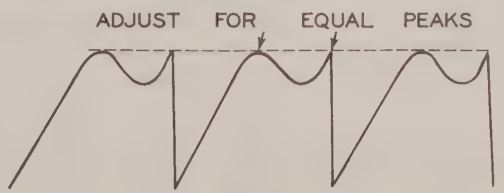

FIG. 7

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V15, V16 and V18. Check adjustment B3. Check R85, T3, T5A, C66, C67 and other associated components.

DRIVE LINES

Check by substitution V15 and V16. Check adjustment B3. Check C66, C67, R85, T3, T5A and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V15 and V16. Check horizontal output and damper stages for component failure and change of value.

FOLDS

Follow procedure outlined in "Drive Lines".

PIE CRUST EFFECT

Check by substitution V14, V15 and V16. Check C60 for open. Check L22, C62, [illegible], R82 and other associated components.

XMAS TREE EFFECT

Check by substitution V14, V15 and V16. Check T3 and T5A for internal arcing. Check C62, C65, C64, C66, C67, L22, R81, R82 and other associated components.

VERTICAL

LOSS OF SWEEP

Check by substitution V11 and V13. Check waveform W8.

If Satisfactory	If Unsatisfactory
Check T4, T5B, R66, R65, C4B, C4C and other associated components.	Check T2, C50, C52, R62, R5, R66 and other associated components.

INSUFFICIENT SWEEP

Check by substitution V11 and V13. Check height and vertical linearity controls for proper operation. Check T4, T5B, R62 and other associated components.

COMPRESSED AT BOTTOM

Check by substitution V11 and V13. Check R66, R62, R5, C52 and other associated components.

COMPRESSED AT TOP

Check by substitution V11 and V13. Check R65, R3, C4C, T4 and other associated components.

FOLDS

Check by substitution V11 and V13. Check C51, C52, R63, T4 and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Check by substitution V11 and V12. Check C45, C46, C48, R50, R53, R57, R56 and other associated components.

LOSS OF VERTICAL SYNC - HORIZONTAL SYNC SATISFACTORY

Substitute V11. Check waveform W6.

If Satisfactory	If Unsatisfactory
Check T2, C50, R61, R60, R4 and other associated components.	Check vertical integrator network. Check video IF alignment for overloading.

LOSS OF HORIZONTAL SYNC - VERTICAL SYNC SATISFACTORY

Substitute V14. Check C55, C58, R74, R73, R80, L22 and other associated components.

HORIZONTAL BENDING

Check by substitution V11, V12 and V14. Check horizontal AFC network.

VIDEO

LOSS OF VIDEO

Substitute V6. Check C36, C34, C1C, R30, R32, L20, L19 and other associated components.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check adjustment A7. Check video IF alignment.

POOR CONTRAST

Substitute V6. Check contrast control, picture tube and video crystal detector network. Check C34, C36, L17, L16 and other associated components.

NEGATIVE PICTURE

Substitute V6. Check picture tube and video crystal detector network. Check video IF alignment. Check R32, C34, C36 and other associated components.

SMEAR

Substitute V6. Check L17, L16, L19, C36 and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V1, V3, V4, V5 and V6 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V7, V8, V9 and V10. Check stages V9 and V10 using audio signal generator. Apply audio signal across R1B.

If Satisfactory	If Unsatisfactory
Check ratio detector and audio IF stages for component failure or change of value.	Check C43, C44, C4A, C3, R45, R47, T6, speaker and another associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustment A10. If still unsatisfactory, check audio IF alignment.

DISTORTED

Follow procedure outlined under "Weak or No Sound".

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: OLYMPIC PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE
V1	RF Amp.	6BQ7A *	6BQ7A	9AJ
V2	Mixer - Osc.	6J6	6J6	7BF
V3	1st Video IF Amp.	6AU6	6AU6	7BK
V4	2nd Video IF Amp.	6AU6	6AU6	7BK
V5	3rd Video IF Amp.	6CB6	6CB6	7CM
V6	Video Output	12BY7	12BY7	9BF
V7	Sound IF Amp.	6AU6	6AU6	7BK
V8	Ratio Det	6AL5	6AL5	6BT
V9	AF Amp.	6AV6	6AV6	7BT
V10	Audio Output	6W6GT	6W6GT	7S
V11	Sync Separator - Vert. Oscillator	12AU7	12AU7	9A
V12	Sync Separator - Limiter Sync Amp.	12AX7	12AX7	9A
V13	Vert. Output	6V6GT	6V6GT	7S
V14	Horiz. AFC - Horiz. Osc.	6SN7GT	6SN7GT	8BD
V15	Horiz. Output	6BQ6GT	6BQ6GT	6AM
V16	Damper	6W4GT	6W4GT	4CG
V17	HV Rectifier	1B3GT †	1B3GT	3C
V18	LV Rectifier	5U4G	5U4G	5T

* 6BZ7 used as alternate in "U" chassis. 6BC5 or 6CB6 used in "R and S" chassis.
† 1X2B used in some versions.

PROPERTY OF
E. F. BLANK
3924 MEADE ST.
DENVER, COLORADO

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: OLYMPIC PART No.	CBS-HYTRON PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V19	21ZP4B 21ZP4A 17HP4	21ZP4B ② 21ZP4A 21ZP4 ① 17HP4/ 17RP4 17HP4B ②	21ZP4B ② 21ZP4A 17HP4/17RP4	21ZP4B ② 21ZP4A 17HP4/ 17RP4	21ZP4B ② 21ZP4A 17HP4/17RP4	12N 12N 12D 12L 12L	① Circuit change necessary. ② Aluminized.

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: OLYMPIC PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	60	350	CO330	E59B264		B034			TVA-3641	
B	60	350				BR435				
C	4	350								
C2	4	50	CO2756	PRS150/4		BR550		TC30	TVA-1303	
C3	50	250	CO2068	PRS450/50		BR5025		TC39	TVA-1713	
C4A	40	200	CO3381	E59B265					TVA-3611	
B	30	350								
C	125	25								
C5	3-9									
C6	800			EF-001	MFT-1000				503C-D1	
C7	2.2			SI2.2NP0	TCZ-2.2	TZ05	NP0K-2R2		5TCCB-V22	
C8	800			EF-001	MFT-1000				503C-D1	
C9	1000			BPD-001	DD-102	K080	801-001	DC-521	5HK-D1	
C10	.5-3				829-3		3115-01-0R5	CT565A		
C11	1.5			SI1.5NP0	TCZ-1.5	Z004	NP0A-1R5	ZT-5515	5TCCB-V15	
C12	47			SI47	D6-470	G033	GP1K-470	UC-5447	5GA-Q47	
C13	800			EF-001	MFT-1000				503C -D1	
C14	47			SI47	D6-470	G033	GP1K-470	UC-5447	5GA-Q47	
C15	.5-3				829-3		3115-01-0RA	CT565A		
C16	10			SI10NP0	TCZ-10	TZ09	NP0A-100	ZT-541	5TCC-Q1	
C17	5									
C18	1000			BPD-001	DD-102	K080	801-001	DC-521	5HK-D1	
C19	6.8			SI6.8NP0	TCZ-6.8	TZ08	NP0K-6R8	ZT-5568	5TCCB-V68	
C20	120			SI120	D6-121	TP35	GP2K-121	UC-5312	5GA-T12	
C21	800			EF-001	MFT-1000				503C-D1	
C22	800			EF-001	MFT-1000				503C-D1	
C23A	1500		CC2D152X	BPD-2X0015	DD2-152	DK071	812-2X0015	DCD-5215	5HK-2D15	
B	1500									
C24	2.2		CO1112 ①	SI2.2NP0	TCZ-2.2	TZ05	NP0K-2R2		5TCCB-V22	
C25	68			SI68	D6-680	TP32	GP1K-680	UC-5468	5GA-Q68	
C26A	1500		CC2D152X	BPD-2X0015	DD2-152	DK071	812-2X0015	DCD-5215	5HK-2D15	
B	1500									
C27	3.3		CO3468	SI3.3NP0	TCZ-3.3	TZ06	NP0K-3R3	ZT-5533	5TCCB-V33	
C28	47		RCM-20C-470K	SI47N750	TCN-47	TN14	N750K-470	NT-5447	5TCU-Q47	
C29A	1500		CC2D152X ②	BPD-2X0015	DD2-152	DK071	812-2X0015	DCD-5215	5HK-2D15	
B	1500									
C30	5000		CCD502X	BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C31	10		CCD-C100M	SI10NP0	TCZ-10	TZ09	NP0A-100	ZT-541	5TCC-Q1	
C32	10		CCD-C100M	SI10NP0	TCZ-10	TZ09	NP0A-100	ZT-541	5TCC-Q1	
C33	.22	200	CO-H-2224	P288-22		PJ2P22		PT4022	2TM-P22	
C34	.047	400	CO-H-4473	P488-047	DF-503	CUB4S47		PT4147	4TM-S47	
C35	330		CCD331M	SI330	D6-331	TP43	GP2K-331	UC-5333	5GA-T33	
C36	.1	400	CO-H-4104	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C37	5000		CCD502X	BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C38	5000		CCD502X	BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C39	330		CCD331M	SI330	D6-331	TP43	GP2K-331	UC-5333	5GA-T33	
C40	330		CCD331M	SI330	D6-331	TP43	GP2K-331	UC-5333	5GA-T33	
C41	330		CCD331M	SI330	D6-331	TP43	GP2K-331	UC-5333	5GA-T33	
C42	.002	600	CO-H-6202	P688-002	D6-202	CUB6D2	GP2L-202	PT622	6TM-D2	
C43	5000		CCD502X	BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C44	10000		CCD103X	BPD-01	DD-102	K082	811-01	DC-511	5HK-S1	
C45	.002	600	CO-H-6202	P688-002	D6-202	CUB6D2	GP2L-202	PT622	6TM-D2	
C46	220		CCD221M	SI220	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	
C47	1000		CCD102K	BPD-001	DD-102	K069	801-001	DC-521	5HK-S1	
C48	.05	400	CO-H-4473	P488-05	DF-503	CUB4S5		PT415	4TM-S5	
C49A	2000							DC-522		
B	5000		♦PC2435	♦PA-110	♦PC-100	♦115TM1	♦1405-01	DC-525	♦V-1	
C	5000							DC-525		
C50	.0047	600	CO-O-6472K	P688-005	D6-502	CUB6D5	GP2-333-502	PT625	6TM-D5	
C51	.035	600	CO-O-6353K ⑤	P688-035		CUB6S35		PT6135	6TM-S35	
C52	.1	400	CO-H-4104	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C53	.02	400	CO-H-4203	P488-02		CUB4S2		PT412	4TM-S2	
C54	.0047	600	CO-H-6472	P688-005	D6-502	CUB6D5	GP2-333-502	PT625	6TM-D5	
C55	47	500	RCM-20C-470K	1469-470	TCZ-47	22R5Q47	NP0K-470	MCB225	MS-45	
C56	47	500	RCM-20C-470K	1469-470	TCZ-47	22R5Q47	NP0K-470	MCB225	MS-45	
C57	47	500	RCM-20C-470K	1469-470	TCZ-47	22R5Q47	NP0K-470	MCB225	MS-45	
C58	.047	400	CO-H-4473	P488-05	DF-503	CUB4S5		PT415	4TM-S5	

OLYMPIC MODELS 17CR20, 17TR10, 17TR19, 21CS12, 21CS18, 21CU15, 21CU16, 21KS22, 21TS11, 21TS17, 21TU14 (Ch. R, S, U)

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING 'VOLT	REPLACEMENT DATA OLYMPIC PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C59	.047	400	CO-H-4473	P488-05	DF-503	CUB4S5		PT415	4TM-S5	
C60	.022	400	CO-H-4203	P488-022	DF-203	CUB4S22	817-02	PT4122	4TM-S22	
C61	.47	200	CO-H-2474	P288-47		PJ2P47		PT4047	2TM-P47	
C62	180	1000	SCM-40C-181K							
C63	.0354	600	⑦	P688-035		CUB6S35		PT6135	6TM-S35	
C64	.01	600	CO-B-6103	P688-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	
C65	.001	600	CO-O-6102K	P688-001	D6-102	CUB6D1	GP2L-102	PT621	6TM-D1	
C66	330	500	③	1468-331	D6-331	5W5T33	GP2K-331	UC-5333	5GA-T33	
C67	180	1000	④							
C68	.047	400	CO-H-4473	P488-05	DF-503	CUB4S5		PT415	4TM-S5	
C69	.1	400	CO-H-4104	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C70	.001	600	CO-O-6102K⑥	P688-001	D6-102	CUB6D1	GP2L-102	PT621	6TM-D1	
C71	.002	600	CO-H-6202	P688-002	D6-202	CUB6D2	GP2L-202	PT622	6TM-D2	
C72	.1	400	CO-H-4104	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C73	56	2000	CCD560K		DD30-560		3KV-560		20GA-Q56	
C74	.01	600	CO-B-6103	P688-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	

♦ Items C49A, C49B, C49C, R59A, R59B, R59C are combined in one unit.
① Used on 21" U Models only.
② C29B is not used in all versions.
③ Some versions may use 470MMF, 680MMF or .001MFD in this application.
④ Not used in all versions.
⑤ Run 1 versions use .05MFD in this application.
⑥ Not used in Run 1. Run 2 has 680MMF in this application.
⑦ Run 2 has .1MFD in this application.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA OLYMPIC PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1500Ω	½	PT-2774	*QJ-404	RTV-196	F1-7	UF152L †	Contrast - Panel
B	1Meg	½				R2-52	UR16A †	Volume - Rear
C	Switch					KB-1	US-26 †	Attach to R1B
R2A	50KΩ	½	PT-2268-1	Q11-123	A47-50K-S	AB-31	U-35	Horiz. Hold
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R2A
R3A	5000Ω	½	PT-2271-1	Q11-114	A47-5000-S	AB-10	U-14	Vert. Linearity
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R3A
R4A	1Meg	½	PT-2269	Q11-137	A47-1Meg-S	AB-6⑪	U-54	Vert. Hold
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R4A
R5A	2.5Meg	½	PT-2272-1	Q11-239	A47-2.5Meg-S	AB-83	U-255	Height
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R5A
R6A	500KΩ	½	PT-2270-1	Q11-133	A47-500K-S	AB-5⑪	U-50	Brightness
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R6A

* CONCENTRIKIT EQUIVALENT KIT: K-2 BASE ELEMENTS & SHAFTS B17-109 & P1-109 (PANEL)
B13-137 & R1-126 (REAR)
76-1 SWITCH

† Universal Replacement (Mallory exact duplicate part no. UE195S).

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA OLYMPIC PART No.	IRC PART No.	NOTES
R7	15KΩ	½		BTS-15K	
R8	47KΩ	½		BTS-47K	
R9	330KΩ	½		BTS-330K	
R10	1500Ω	½		BTS-1500	
R11	220KΩ	½		BTS-220K	
R12	10KΩ	½		BTS-10K	
R13	220KΩ	½		BTS-220K	
R14	10KΩ	½		BTS-10K	
R15	15KΩ	½		BTS-15K	
R16	1000Ω	½	REB102M	BTS-1000	
R17	47Ω	½	REB470M	BTS-47	
R18	330Ω	½	REB331M	BTS-330	
R19	1000Ω	½	REB102M	BTS-1000	
R20	15KΩ	½	REB153K	BTS-15K	
R21	47Ω	½	REB470M	BTS-47	
R22	330Ω	½	REB331M	BTS-330	
R23	4700Ω	½	REB472K	BTS-4700	
R24	150Ω	½	REB151M	BTS-150	
R25	330Ω	½	REB331M	BTS-330	
R26	5600Ω	½	REB562K	BTS-5600	
R27	1Meg	½	REB105M	BTS-1Meg	
R28	1Meg	½	REB155K	BTS-1Meg	
R29	560KΩ	½		BTS-560K	Note 1
R30	1500Ω	½	REB152M	BTS-1500	Note 10
R31	33KΩ	2	RED333M	BTB-33K	Note 4
R32	4700Ω	2	RED472K	BTB-4700	
R33	22KΩ	1	REB223M	BTA-22K	
R34	220KΩ	½	REB224M	BTS-220K	
R35	220KΩ	½	REB224M	BTS-220K	
R36	100KΩ	½	REB104M	BTS-100K	
R37	47KΩ	½	REB473M	BTS-47K	
R38	1000Ω	½	REB102M	BTS-1000	
R39	150Ω	½	REB151M	BTS-150	
R40	10Meg	½	REB106M	BTS-10Meg	
R41	10KΩ	½	REB103K	BTS-10K	
R42	10KΩ	½	REB103K	BTS-10K	
R43	22KΩ	½	REB223M	BTS-22K	
R44	10Meg	½	REB106M	BTS-10Meg	
R45	100KΩ	½	REB104K	BTS-100K	
R46	330KΩ	½	REB334K-A	BTS-330K	
R47	330Ω	2	RED331M	BTB-330	
R48	470KΩ	½	REB474M	BTS-470K	
R49	2.2Meg	½	REB255K	BTS-2.2Meg	
R50	22KΩ	1	REB223M	BTA-22K	Note 5

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA OLYMPIC PART No.	IRC PART No.	NOTES
R51	100KΩ	½	REB104K	BTS-100K	
R52	33KΩ	½	REB333K	BTS-33K	
R53	33KΩ	½	REB333K	BTS-33K	
R54	180KΩ	½	REB184K-A	BTS-180K	
R55	560KΩ	½		BTS-560K	Note 2
R56	22KΩ	1	REB223M	BTA-22K	
R57	10KΩ	½	REB103K	BTS-10K	
R58	47KΩ	½	REB473M	BTS-47K	Note 6
R59A	22KΩ	½		BTS-22K	
B	8200Ω	½	♦PC2435	BTS-8200	
C	8200Ω	½		BTS-8200	
R60	1.5Meg	½	REB155K	BTS-1.5Meg	
R61	220KΩ	½	REB224M	BTS-220K	
R62	470KΩ	½	REB474M	BTS-470K	
R63	10KΩ	½	REB103K	BTS-10K	Note 7
R64	3.9Meg	½		BTS-3.9Meg	Note 8
R65	560Ω	½	REB561K	BTS-560	
R66	330Ω	½	REB331M	BTS-330	
R67	22KΩ	½	REB223M	BTS-22K	
R68	560Ω	½	REB561K	BTS-560	
R69	560Ω	½	REB561K	BTS-560	
R70	330KΩ	½	REB334K-A	BTS-330K	
R71	82KΩ 5%	1		BTA-82K 5%	
R72	82KΩ 5%	½		BTS-82K 5%	Note 1
R73	68KΩ	1	REC683K-A	BTA-68K	
R74	150KΩ	½	REB154K-A	BTS-150K	
R75	180KΩ	½	REB184K-A	BTS-180K	
R76	820KΩ	1	REC824K-A	BTA-820K	
R77	330KΩ 5%	1	REC334J-A	BTA-330K 5%	
R78	3900Ω	½	REB392K	BTS-3900	
R79	150KΩ 5%	1		BTA-150K 5%	
R80	8200Ω	½	REB822K	BTS-8200	
R81	68KΩ 5%	1		BTA-68K 5%	Note 11
R82	22KΩ	1	REB223M	BTA-22K	
R83	47Ω	½	REB470M	BTS-47	
R84	470KΩ	½	REB474M	BTS-470K	
R84	18KΩ	2	RED183K	BTB-18K	Note 9
R86	100KΩ	½	REB104M	BTS-100K	
R87	47KΩ	½	REB473M	BTS-47K	
R88	330KΩ	½	REB334M	BTS-330K	
R89	22KΩ	1		BTA-22K	Note 12
R90	2700Ω	½	REB272K	BTS-2700	

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (cont)

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	OLYMPIC PART No.	IRC PART No.	
R91	200Ω	20		2D-200	Note 3
R92	100KΩ	1		BTA-100K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	OLYMPIC PART No.	IRC PART No.	
R93	1000Ω	½		BTS-1000	Note 1

♦ Items R59A, R59B, R59C, C49A, C49B and C49C are combined in one unit.
Note 1: Not used in all versions.
Note 2: Some versions may use a 470KΩ resistor in this application.
Note 3: Some versions may use a 400Ω 20 watt in this application.
Note 4: Run 1 uses a 47KΩ 2 watt resistor in this application.
Note 5: Run 1 uses a 33KΩ resistor in this application.
Note 6: Run 1 uses a 22KΩ resistor in this application.
Note 7: Run 1 uses a 12KΩ resistor in this application.
Note 8: Run 1 uses a 1.5Meg resistor in this application.
Note 9: Run 1 uses a 22KΩ 2 watt resistor in this application.
Note 10: Not used in run 1.
Note 11: Run 2 uses a 82KΩ 1 watt resistor in this application.
Note 12: Run 2 uses a 47KΩ 1 watt resistor in this application.

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TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	OLYMPIC PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @1.42A	600VCT .200ADC	5VAC @3A	TR-2770	P-8335 ①			R-39BC①		
	SEC. 3	SEC. 4	SEC. 5							
	6.3VAC @1.2A	6.3VAC @ 8A								

① Drill new mounting holes.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA							
		OLYMPIC PART No.	Halldorson PART No.	Merit PART No.	RCA PART No.	Ram PART No.	Stancor TYPE No.	Thordarson PART No.	Triad PART No.
T2	Vert. Osc. Trans.	TR1473	B6702	A-3003	209T1 ①	V405	A-8125	24A87 ①	A-97X
T3	Horiz. Output Trans.	TR2771-1 TR2771-2 ②	FB411③*	HV0-9③*	230T1③*	X080③*		*FLY-14③	D-19③*
T4	Vert. Output Trans.	TR3385	Z1803	A-3036	204T9③	V309	A-8112	26S51	A-99X①
T5A B	Yoke-Horiz. (13.5MH) Vert. (37MH)	CL2753	DF602	MDF-72	21ID2	Y70F14/43	DY-9A	Y-7	Y-17-1

① Drill one new mounting hole.
② Alternate horizontal output transformer.
③ Drill new mounting holes.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

	ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
	9	9	9	9	9		9	9
	8 & 7	8	8	8	8 & 7		8 & 7	8 & 7
	5	5	5	5	5		5	5
	4	4	4	4	4		4	4
	3	3	3	3	3		3	3
	1	1	1	1	1		1	1

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	OLYMPIC PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T6	2.4KΩ	3.5Ω	TR2766-1	A-3332	A-3025	S-12X	Z1101	26S58	

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	OLYMPIC PART No.	VIKING PART No.	QUAM PART No.	
SP1	5"	PM	3.5Ω	SK1788-2	5J6	5A07	① Used in Model 21CU15
	8"	PM	3.5Ω	SK1906-2 ①	8J9	8A21	② Used in Models 21CU16 and 21KS22
	10"	PM	3.5Ω	SK1789-1 ②	10J11	10A31	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	OLYMPIC PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	0ΩCT	0Ω					
L2	Fil. Choke	0Ω						
L3	Neut. Coil	0Ω						
L4	RF Mixer Grid, Osc. Coils	0Ω						
L5	Fil. Choke	0Ω						
L6	RF Choke	0Ω						
L7	1st Video IF	.9Ω						
L8	RF Choke	1.2Ω						
L9	RF Choke	3.7Ω		CL3401	19-3075*	TV-181*	6172*	80 Microhenries; Wound on 22KΩ resistor

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (cont)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	OLYMPIC PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L10	Adj. Channel Sound Trap	0Ω		CL2973	20-1006		6171A	Note
L11	2nd Video IF	.3Ω	.3Ω	CL2309	17-1063		6249	
L12	Accompanying Sound Trap	0Ω		CL2972	20-1021	TV-112♦	6171♦	
L13	3rd Video IF	.3Ω	.3Ω	CL2309	17-1064		6250	
L14	4th Video IF	.3Ω	.3Ω	CL2309	17-1063		6249	
L15	Series Peaking Coil	3.4Ω		CL1535	19-3036	TV-180	6176	36 Microhenries
L16	Series Peaking Coil	3.8Ω		CL3401	19-3075*	TV-181*	6172*	80 Microhenries; Wound on 22KΩ resistor
L17	Shunt Peaking Coil	8.5Ω		CL3403	19-3300		6155	300 Microhenries
L18	Sound IF	2.8Ω	2.5Ω	TR3386				Includes 4.5MC trap
L19	Series Peaking Coil	7.5Ω		CL3398	19-3250■	TV-185■	6181■	250 Microhenries; Wound on 15KΩ resistor
L20	Shunt Peaking Coil	9Ω		CL3403	19-3300		6155	300 Microhenries
L21	Ratio Det	5.5Ω	1.8ΩCT	TR2630	17-3497	TV-M5	6205	Tertiary winding = .7Ω
L22	Horiz. Osc.	72Ω		TR2990	20-1402	TV-162	6183	Tapped at 50Ω Waveform winding = 45Ω

* Parallel with 22KΩ resistor.
■ Parallel with 15KΩ resistor.
♦ Enlarge mounting hole.
Note. Used on "U" chassis only.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			OLYMPIC PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1*	3AG Pigtail	3/8A/ 250V	FU1683		318.375 (3/8A-3AG-Pigtail)		GJV 3/8	

* Run #1 used 1/4A/250V fuse in this application.

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		OLYMPIC PART No.	FEDERAL PART No.	SYLVANIA PART No.	
M2	CK706A	CK706A*	1N64A	1N60 or 1N132	Video Det.

* Some versions may use 1N60 or 1N64 crystal diode in this application.

MISCELLANEOUS

ITEM No.	PART NAME	OLYMPIC PART No.	NOTES
M3A	Tuner	CL-2755-2	VHF "U" Chassis only
B	Tuner	CL-3402	VHF "R" & "S" chassis only
M4	Focus Magnet	PP3379	Includes centering device "S" & "U" chassis only
M5A	Ion Trap	PP2248	"S" & "U" chassis only
B	Ion Trap	PP2623	"R" chassis only
M6	Centering Magnet	PP2763	"R" chassis only
B3	Trimmer Cap.	CT2757	Horiz. Drive (50-370MMF)
	Cabinet	CA3246-1	Model 21TS11
	Cabinet	CA3246-2	Model 21TU14
	Cabinet	CA3246-3	Model 21TS17
	Cabinet	CA3248-1	Model 17TR10
	Cabinet	CA3248-2	Model 17TR19
	Cabinet	CA3296-1	Model 21CS12
	Cabinet	CA3296-2	Model 21CU15
	Cabinet	CA3296-3	Model 21CS18
	Cabinet	CA3328	Model 21CU16
	Cabinet	CA3485	Model 17CR20
	Cabinet	CA3519	Model 21KS22
	Knob	KN2295-1	Channel Selector - Mahogany
	Knob	KN2296	Fine tuning - Mahogany
	Knob	KN2297-1	On-off-volume - Mahogany
	Knob	KN2298	Contrast - Mahogany
	Knob	KN2545	Channel Selector - Tan
	Knob	KN2546	Fine tuning - tan
	Knob	KN2547	On-off-volume - tan
	Knob	KN2548	Contrast - tan
	Safety Glass	PP2937	Models 17TR10, 17TR19
	Safety Glass	PP2938	Model 21KS22
	Safety Glass	PP3393	Models 21S12, 21CU15, 21CU16, 21CS18, 21TS11, 21TS17, 21TU14
	Safety Glass	PP3487	Model 17CR20
	Mask	PP2939	Models 17TR10, 17TR19
	Mask	PP2940	Models 21CS12, 21CS18, 21TS11, 21TS17
	Mask	PP2940-2	Models 21CU15, 21CU16, 21TU14
	Mask	PP2940-3X	Model 21KS22
	Mask	PP3488	Model 17CR20

TROUBLE SHOOTING AIDS (cont)

PROPERTY OF
L. F. BLAKEMORE
3924 MEADE ST.
DENVER, COLORADO

POWER

DEAD SET

If filaments fail to light, check AC interlock assembly. Check switch on volume control and T1. If filaments light, substitute V18. Check B+ filter and decoupling network.

SMALL AND/OR DIM PICTURE

Substitute V18. Check B+ filter and decoupling network.

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V14, V15, V16 and V17. Check M1 fuse. Check waveform W14.

If Satisfactory	If Unsatisfactory
Check T3, T5A, C72, C69, C68, C70, C71, R87, R86, R85 and other associated components.	Check C66, C67, C64, C62, R81, R89, R73, R2 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V15, V16, V17 and V18. Check C67, C66, R85, R89, T3 and other associated components.

BLOOMING

Check by substitution V15, V16, V17 and V18. Check C66, C67, T3, R85 and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or No Sound".

RASTER, NO SOUND, NO PICTURE

Check by substitution V1, V2, V3, V4, V5 and V6. Check video IF components for failure or change of value.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set".

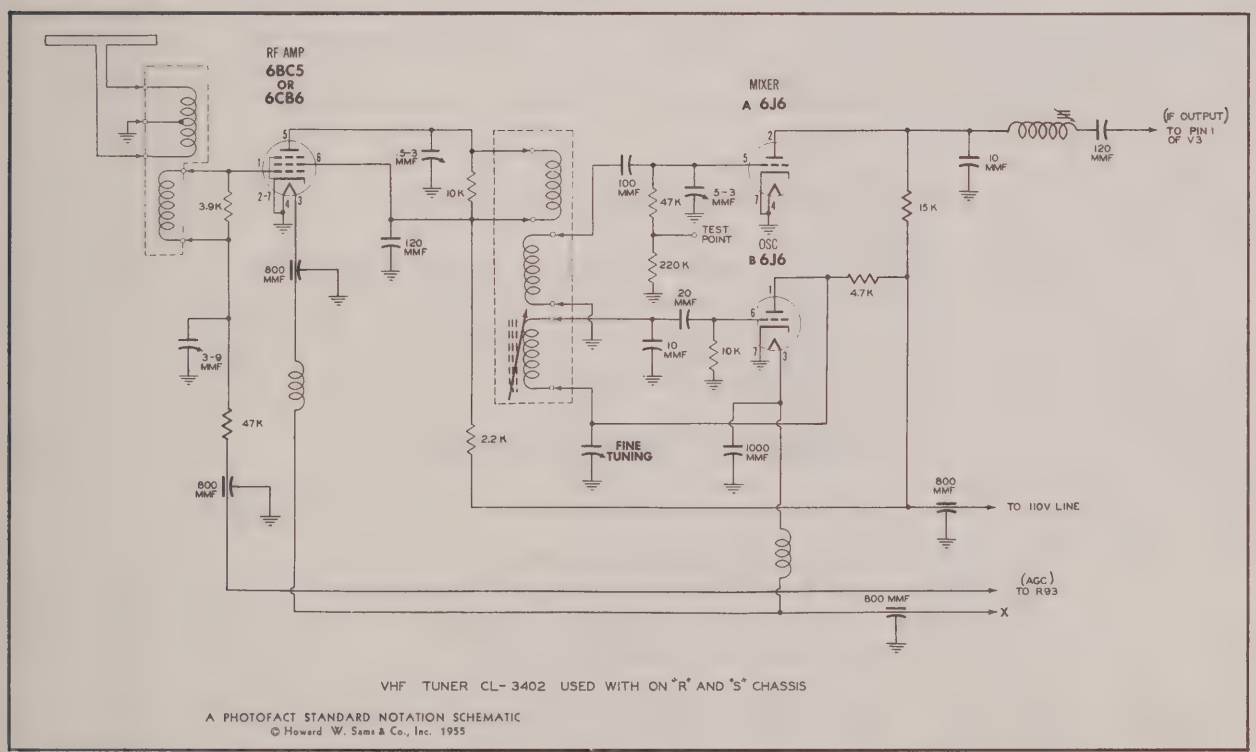
KEYSTONE EFFECT

Check T5 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.



VHF TUNER CL-3402 USED WITH ON "R" AND "S" CHASSIS

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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ALTERNATE TUNER SCHEMATIC

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one at a time, thru the small hole in the cabinet to the right of the channel selector shaft.

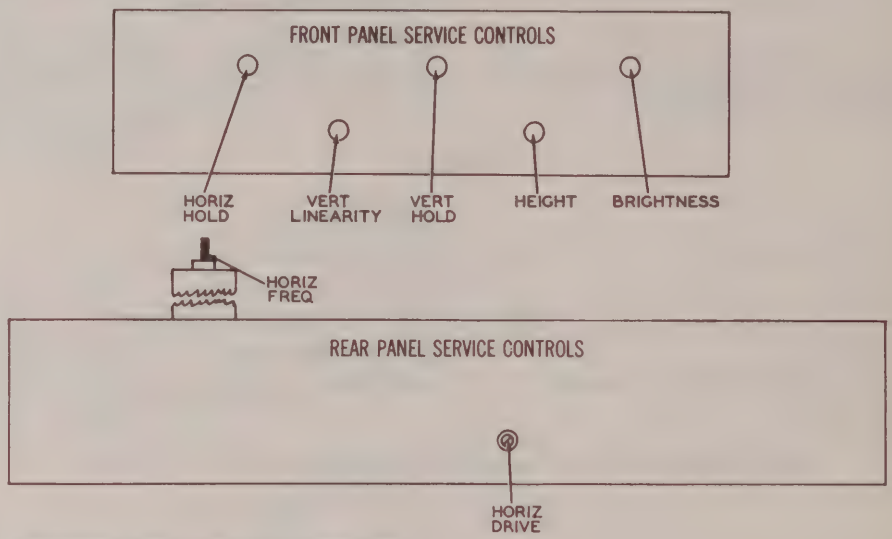
PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass remove 3 wood screws holding wood strip at the top of safety glass. Remove wood strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION



HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal oscillator, it is necessary to remove the rear cover and supply power to set. Adjustment is located on top of chassis. Set the horizontal hold control at the center of its range and adjust the horizontal frequency slug (L22) until picture synchronizes horizontally . (For location see tube placement chart).

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L21) located on top of chassis. (See tube placement chart).

FUSES

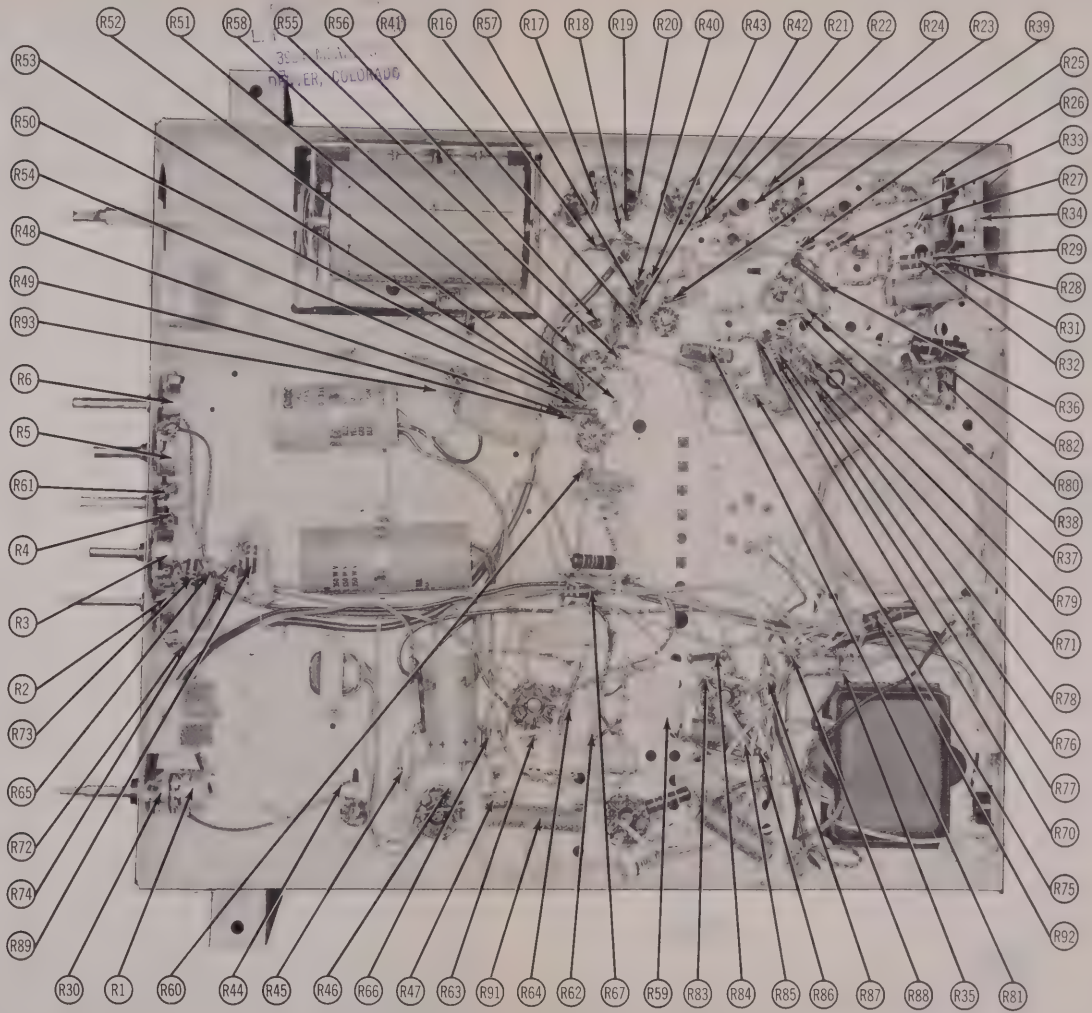
One fuse is used horizontal sweep circuit protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by means of a centering lever on the PM focusing assembly. Adjust the centering lever from side to side, and up and down until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

1. Remove 4 push-on type control knobs from front of cabinet.
2. Remove 2 wood screws and 2 metal screws from rear cover. Remove cover.
3. Disconnect speaker plug. Remove 2 speaker screws. Remove speaker.
4. Remove 4 chassis bolts. Remove chassis.



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PROPERTY OF
L. F. [illegible]
3924 MEADE ST.
DENVER, COLORADO

PENTRON
MODELS HT-225, TR-4

Figure 1A
Model HT-225

Figure 1B
Model TR-4

PENTRON
MODELS HT-225, TR-4

GENERAL INFORMATION

Pentron Models HT-225 and TR-4 are mechanically alike and very similar electrically. The only difference between the two models is that Model HT-225 incorporates two internal speakers plus a tweeter speaker which is built into the lid of the carrying case, whereas, Model TR-4 utilizes but one internal speaker and no tweeter. Model HT-225 has a separate volume control on the tweeter speaker which controls the tweeter output only.

These recorders are designed for double track recording, giving two full length recordings on a single reel of recording tape. Any size reel up to 7" can be used. An electron ray tube is used to simplify the recording level setting. Recordings can be made from a radio, television receiver or phonograph, in addition to those made directly from the microphone. Recordings can be played back through the self-contained speakers or an external speaker may be used through use of the "Ext. Spkr. Jack".

Models HT-225 and TR-4 are designed to operate on 60 cycle, 110 to 125 volts, AC supply only.

CAUTION: Severe Damage Will Result If Connection Is Made To A Direct Current (DC) Line.

Manufactured by:

The Pentron Corporation
777 S. Tripp Avenue
Chicago 24, Illinois

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HOWARD W. SAMS & CO., INC., INDIANAPOLIS, INDIANA

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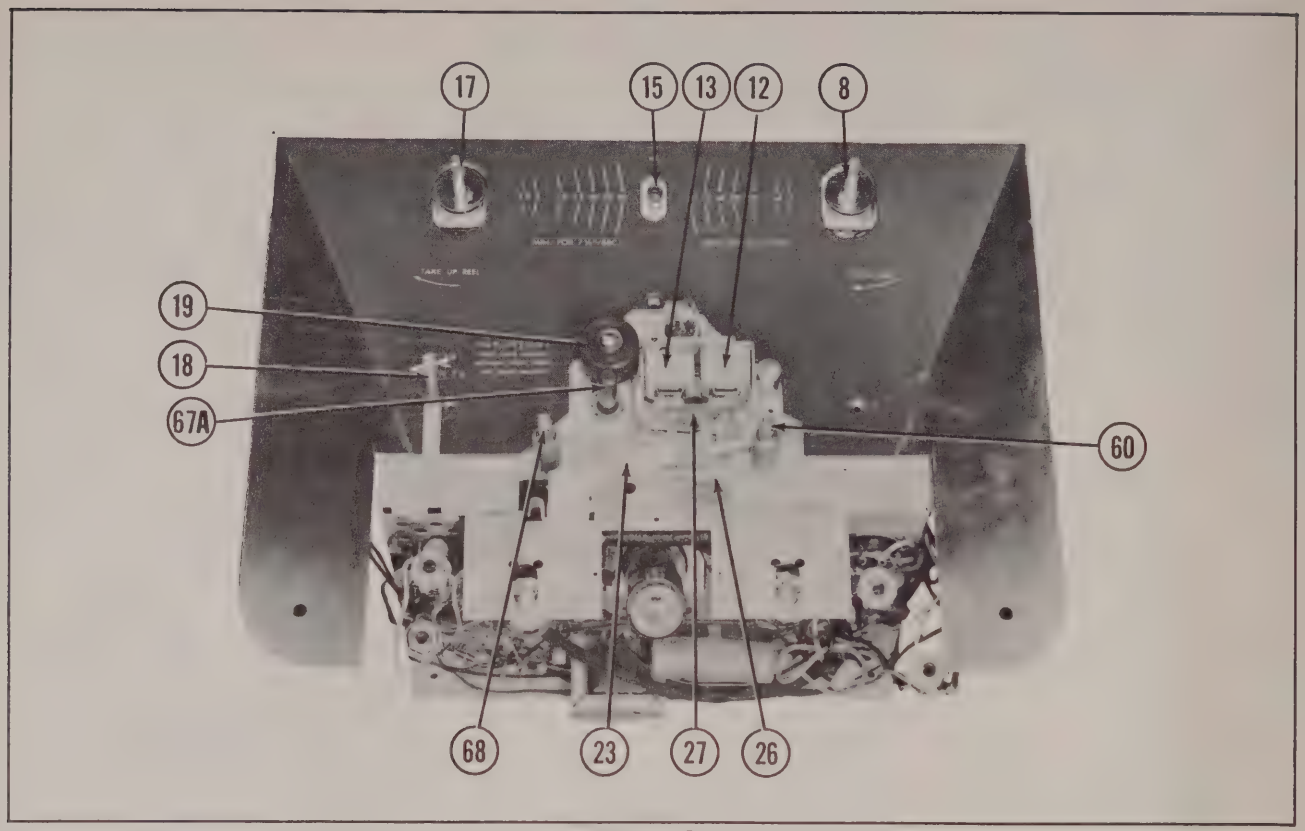


Figure 2

SPECIFICATIONS

Frequency Response -

7 1/2" per second - 50 to 8000 cycles.
3 3/4" per second - 50 to 5000 cycles.

Recording Time (Using Both Tracks) -

2 hours on 7" reel at 3 3/4" per second.
1 hour on 5" reel at 3 3/4" per second.
1 hour on 7" reel at 7 1/2" per second.
1/2 hour on 5" reel at 7 1/2" per second.

Fast Forward -

7" reel in 70 seconds.

Fast Rewind -

7" reel in 70 seconds.

Power Consumption -

80 watts.

Signal To Noise Ratio -

50db

Wow And Flutter -

Less than 0.5 %

Audio Inputs -

Microphone and radio.

Audio Outputs -

External amp. and external spkr.

OPERATING INSTRUCTIONS

Preparing For Operation -

After opening the recorder, remove all packing material. Insert the A. C. power cord plug into a convenient wall receptacle of the proper rating.

Threading The Tape -

1. Place a full reel of tape on the right hand (feed reel) spindle so that the reel will turn clockwise when tape is pulled from the reel.

NOTE: These Pentron Recorders use type "A" wound tape, i. e. the dull magnetic coated side faces the center of the reel. If the tape used is type "B" (coated side facing outward), recordings will be made at a very low sound level and playback will be inaudible.

2. Place an empty reel on the left hand spindle (take-up reel). Be sure that both reels are engaged with the drive pins on the spindles.

3. Reel out about 12" of tape and feed the loose end up into the empty reel on the left spindle. Thread the tape into one of the slots in the outer surface of the hub. Hold the loose end between the fingers and slowly rotate this reel clockwise through a couple of revolutions.

4. Now drop the tape into the slot in front of the recording head and between the rubber and metal rollers.

5. Set the speed change pin (18) so the recorder will run at the speed desired, 3 3/4" per second or 7 1/2" per second.

NOTE: Since quality of recording increases with the speed of the tape it is desirable to use the faster speed for musical recordings. For voice and other types of recordings where maximum fidelity is not necessary, the slow speed is preferable since it doubles the playing time of a given sized reel. For 3 3/4" per second operation, turn the speed change pin (18) clockwise and pull up as far as it will go and release. This engages idler wheel (54) with the small O.D. on the motor pulley (70). For 7 1/2" per second, turn pin (18) clockwise and push down as far as it will go and release. The idler wheel will then engage a larger O.D. of the motor pulley. The speed equalization switch (73) is also actuated by the speed change pin (18) as it is raised or lowered.

To Record From Microphone -

1. Insert the microphone plug into the "Mic." jack located on the left side of the front panel (6).

2. Turn the "Volume-On-Off" control to the "On" position. This supplies power to the amplifier.

3. Turn the "Tone-On-Off" control to the "On" position. This supplies power to the motor.

NOTE: When a green glow appears in the volume indicator eye, the unit will be ready to make a recording.

4. Before making a recording it is generally advisable to set the volume at the proper level. To do this, hold down the record lock button (4) and while talking into the microphone in a natural tone, adjust the "volume" control until the eye just closes on peak signals.

5. While holding lock button (4) in the down position, turn the "Play-Idle-Record" knob to "Record". A recording is now being made and any sounds entering the microphone will be recorded on the tape.

To Record From Radio, TV Or Phonograph -

1. Using any standard interconnecting cable such as the Pentron accessory cord - X166, fasten the two clips to the loud speaker terminals on your Radio, TV or Phonograph and plug the jack into the "Radio" input on the recorder.

2. Adjust the Volume Indicator Eye level as when recording from microphone and operate the lock button (4) and the Play-Idle-Record knob in the same manner.

3. By plugging a set of earphones into the "Ampl. Output" jack the recording may be monitored.

To Play A Recording -

1. With the tape properly threaded, turn the "Play-Idle-Record" knob to "Play".

2. Adjust the "Volume" and "Tone" controls for desired listening level.

Dual Track Recording -

These Pentrons are designed so that only 1/2 the tape width is recorded at a time, thereby, resulting in dual-track recording. This dual-track operation is accomplished in the following manner:

1. After a reel of tape has been recorded, i.e. all the tape wound onto the take-up reel, place the "Play-Idle-Record" knob in "Idle" position. This stops all movement of the tape.

2. Remove the reels from the recorder, turning the full reel over and placing it on the right spindle and the empty reel on the left spindle.

3. Properly thread the tape and proceed with the recording.

4. After the second track has been recorded the first track is ready to be played, without rewinding, as follows:
   a. Place the full reel on the right spindle and empty reel on the left spindle.
   b. Thread the tape making sure the dull side faces the play-record head.
   c. Set the controls as described under "To Play A Recording".

To Use High Speed Wind And Rewind -

These recorders are equipped with an automatic mechanical interlock. Thus when one control is in operating position, the other cannot be actuated. When using the high speed Wind or Rewind, the "Play-Idle-Record" knob must be in the "Idle" position. When using the "Play" or "Record" positions, the "Rewind-Neutral-Wind" knob must be in "Neutral" position.

Turning the knob to "Rewind" enables you to rewind tape at high speed to any given spot or to the end of the reel. Turning the knob to the "Wind" position enables you to skip forward at high speed to any given spot.

To Edit And Splice Tape -

NOTE: Since it is impossible to edit and splice one track without affecting the other, recordings which are to be edited should be limited to one track only.

1. The tape may be edited by cutting out unwanted portions, or by joining selections into another sequence. Announcements may be inserted between selections, etc. Unused sections of tape can be spliced together for re-use.

   a. Cut tape at 60^{0} angle with an overlap so ends will line up. (Cutting tape at 60^{0} angle will eliminate detection of splice on recording.)
   b. Align both ends of tape, with glossy side up.
   c. Cover aligned ends with splicing tape, evenly and securely.
   d. Trim off excess Splicing tape. (Cut into recording tape very slightly.) This eliminates possibility of a sticky splice.

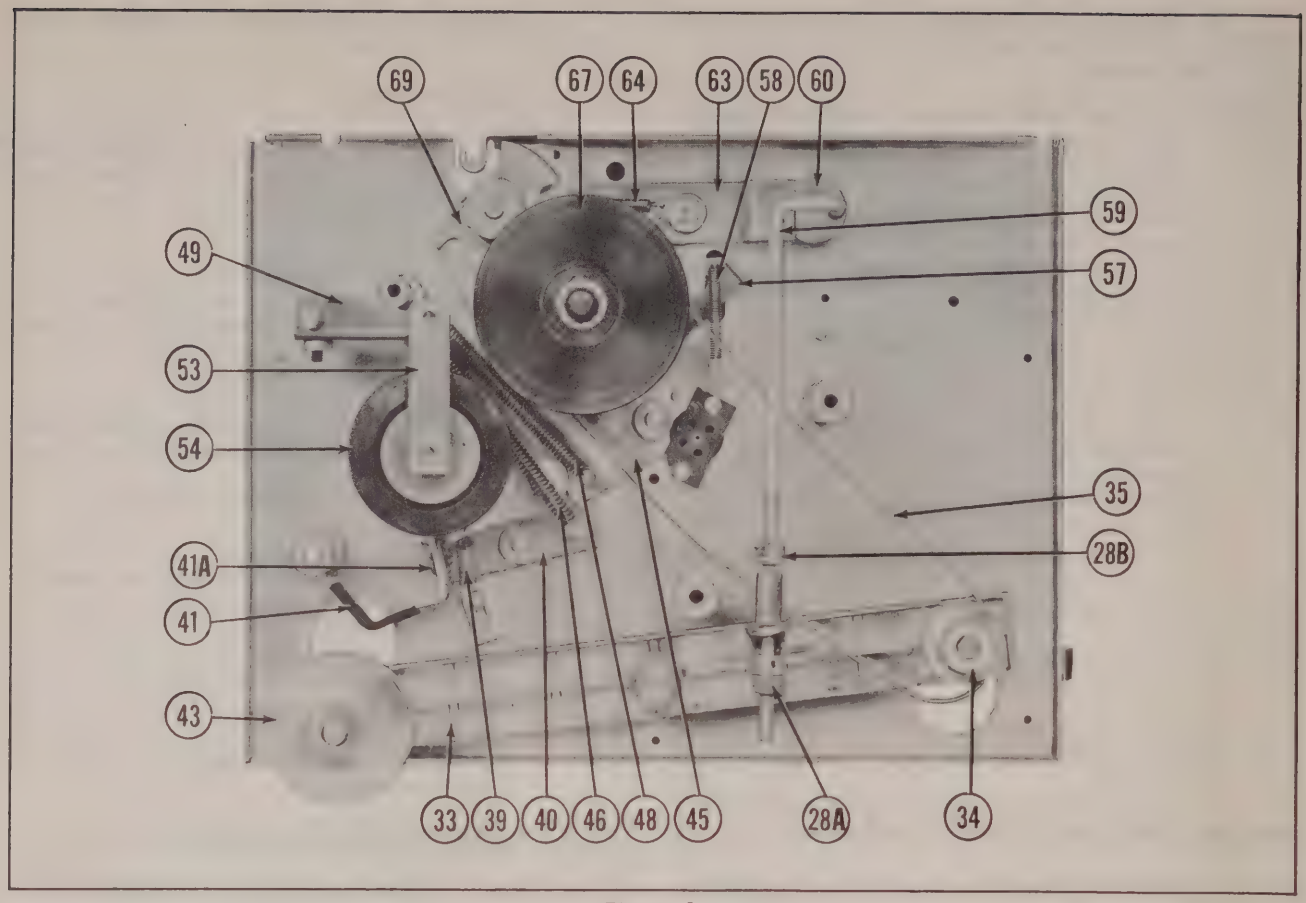


Figure 3

To Use Ext. Speaker - Model HT-225 -

Plugging an external speaker into the "Spkr." jack cuts out the two internal speakers. This external speaker becomes a Woofer operating in conjunction with the Tweeter in the lid.

To Use Ext. Speaker - Model TR-4 -

The "Spkr" jack is used to connect an external speaker for a remote location. Inserting external speaker plug into "Spkr" jack automatically cuts out built in speaker.

FUNCTIONS OF PRINCIPAL PARTS

Wind And Rewind - (Refer to Figure 3) -

When the control knob is turned to "Wind" the tie rod (59) is actuated, causing the equalizer bar (33) to be pivoted clockwise. This causes the take up belt (44) to become taut, which, in turn, drives the take up spindle at a high rate of speed.

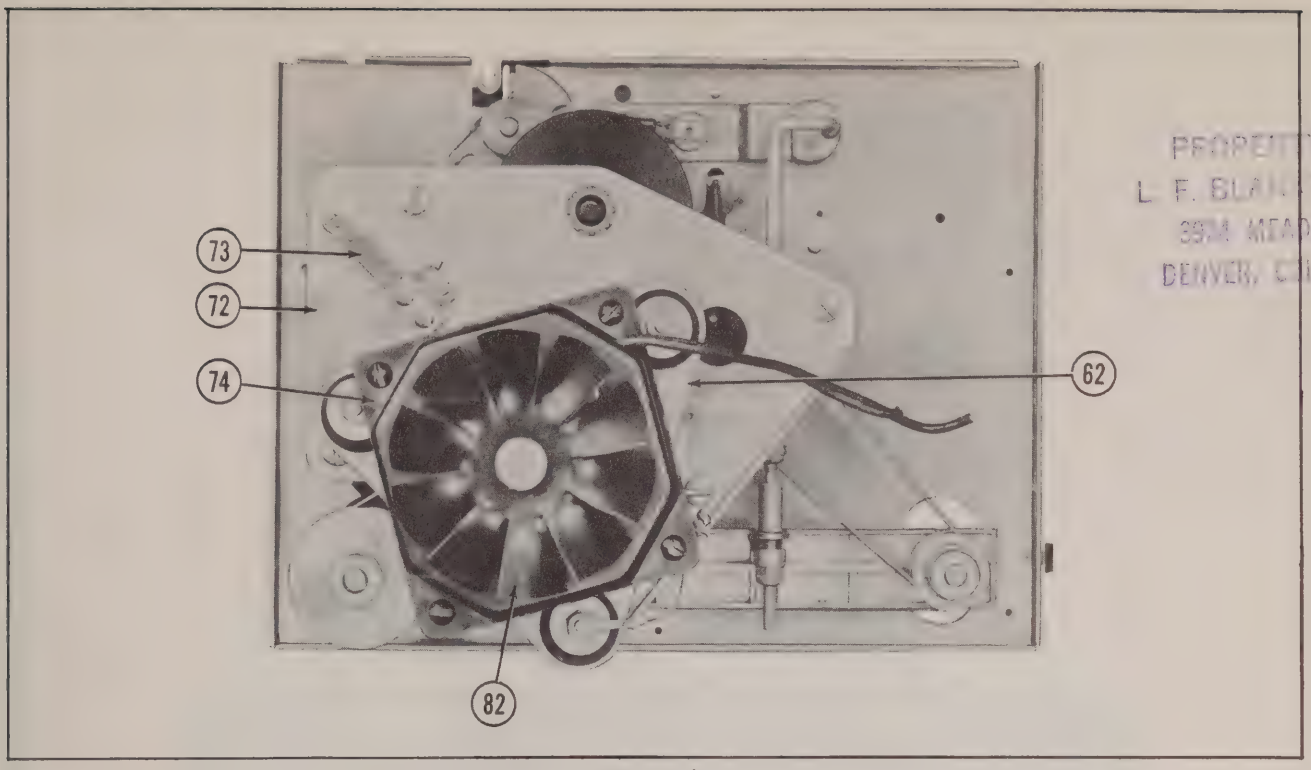
When this knob is turned to Rewind, the equalizer bar is pivoted counterclockwise by the tie rod, causing the feed belt (35) to become taut, thus causing the tape to rewind at a high rate of speed.

Safety Lock -

The safety lock button (4) when depressed, engages the safety lever (23) which in turn actuates the "Play-Record" switch of the amplifler thus closing the circuit for recording. The safety lever (23) is held in this downward position by cam (69), when the "Play-Record" knob is turned to "Record". The main purpose of this record safety lock is to prevent the mechanism from being turned to "Record" unless a recording is to be made. Therefore, this safety devise prevents accidental erasing of recorded material.

Play - Record Control - (Refer to Figure 3) -

When the "Play-Record" control knob is turned to "Play", the pressure roller slide plate (45) is actuated due to the slide plate being held against the control cam (69) by the pressure roller spring (48). This forward movement of the slide plate engages the pressure roller (19) with the capstan (67A), which, in turn, drives the tape at a constant speed. The take up bar (40), which is held against the end of the slide-plate by spring (46), is pivoted as the slide plate moves forward. This causes the boot on the take up adjusting spring (41) to press against the equalizer bar with just enough pressure for the take up belt (44) to rotate the take up spindle so as to wind the tape on the reel. This acts as a clutch by allowing the belt to slip, due to the slower speed of the capstan. Also by the movement of the slide plate (45) pressure is removed from lever (57) which has been engaged with the pressure pad pivot pin on the pressure arm lever (24) which holds the pressure pads away from the heads. When the pressure is removed from the lever (57), the pressure pad spring (58) pulls the pressure arm lever (24) inward causing the pressure pads to bear against the tape to hold it in positive contact with the heads. The operation for this control is the same when turned to "Record", except the Lock Button (4) must be depressed first.



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DENVER, COLORADO

Figure 4

Mechanical Interlock - (Refer to Figure 3) -

The automatic mechanical interlock (63) makes it impossible to actuate one control knob while the other is being used. Therefore, do not attempt to force the knobs.

Volume Indicator Eye -

The volume indicator eye is intended for use during recording. The correct recording volume level is attained when the loudest portions of the signal cause the eye to close. If too high a level is used, distortion will occur. This is indicated by the eye overlapping. Too low a recording level will result in relatively higher background noises.

ADJUSTMENTS

Traction or "Drag" on Reel Spindles -

This adjustment is made by loosening the cap screw (15) and shifting the equalizer bar (33)forward or backward. See Figure 2.

NOTE: To gain access to the cap screw (15), remove the rear head cover (3).

Make the adjustment as follows:

With the controls in "Idle and Neutral", move the equalizer bar (33) to a position such that when one of the reel spindles is grasped with the fingers and pushed backward and forward with rather firm pressure, the movement of the spindle is about an eighth of an inch. Be sure screw (15) is tightened securely.

Take-Up on Take-Up Reel -

Take up adjustment for the "Take Up Reel" is required if, when the control knob is placed in the "Play" or "Record" position, a loop of tape feeds out from the capstan and roller (19) before the "Take Up Reel" starts turning, or if the take up is excessive so as to load the motor and reduce the tape speed.

This adjustment is accomplished by loosening the screw (41A), and holding the finger (41), see Figure 3. Moving the finger toward the equalizer bar decreases the time required for the "Take Up Reel" to start turning, and of course, the finger must be moved away from the equalizer bar to increase the time.

TROUBLES

Motor Runs but Flywheel (67) Fails to Turn -

1. Idler wheel (54) not contacting the motor pulley (70).
   a. Check the speed control shaft (18) to see if it is properly positioned. If the control shaft (18) is midway between the speed setting 3-3/4" per second and 7-1/2" per second the idler wheel will not engage the motor pulley. The control shaft must be turned clockwise and pushed down as far as it will go for 7-1/2" per second or pulled upward as far as it will fo for 3-3/4" per second.
   b. Check spring (39) to see if it is properly connected. If this spring is not connected the idler wheel will not be held in engagement with the motor pulley.

Tape Rewinds at Fast Speed But Fails to Wind -

1. Check the equalizer bar to see if it is adjusted properly. See "Traction" or "Drag" on Reel Spindles.

2. Tie rod (59) out of adjustment.
   a. Tie rod collar (28A) loose or located too near the end of the tie rod (59). Relocate

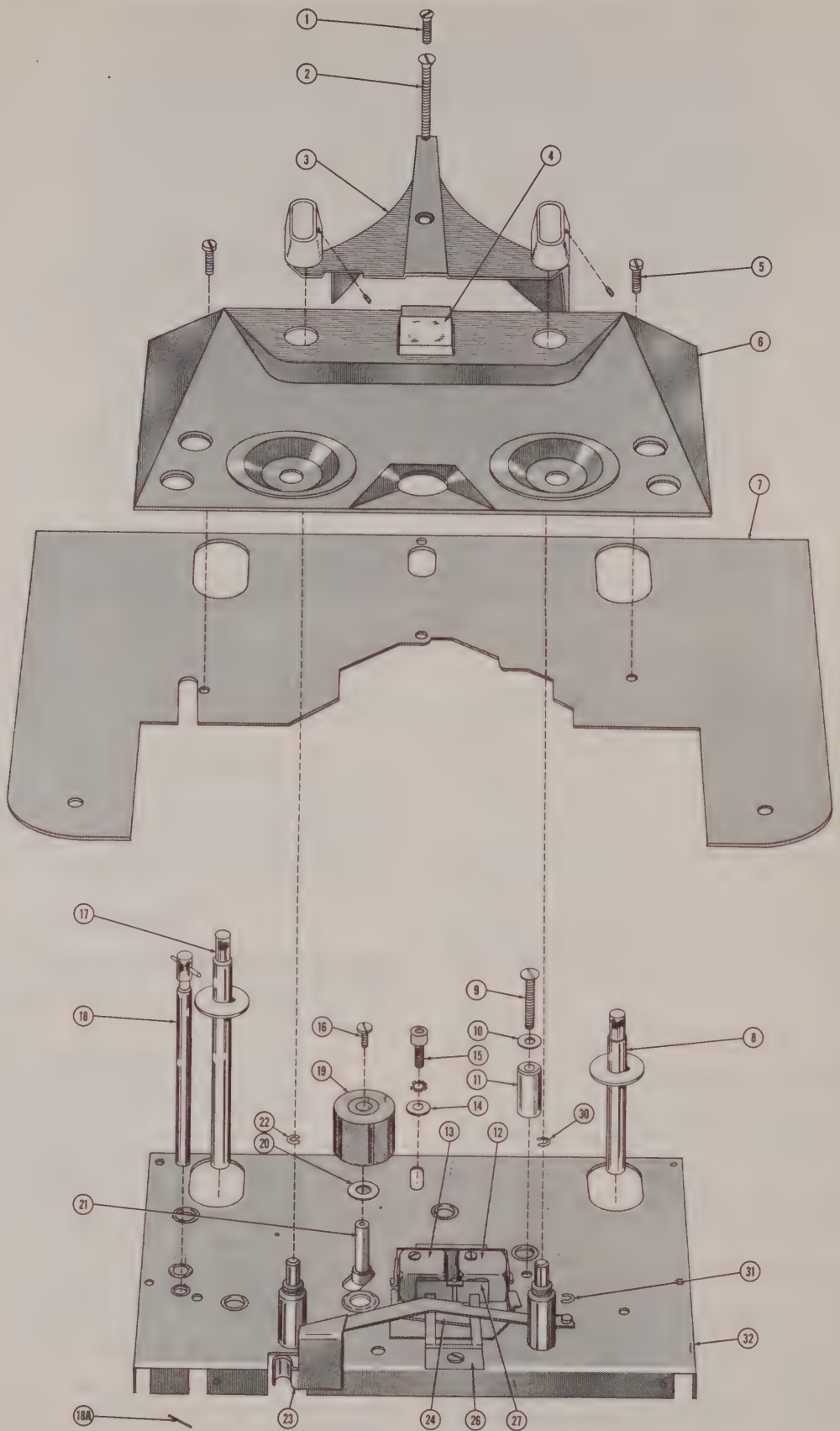

Figure 5A. Exploded View Of Parts Above Baseplate.

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DENVER, COLORADO

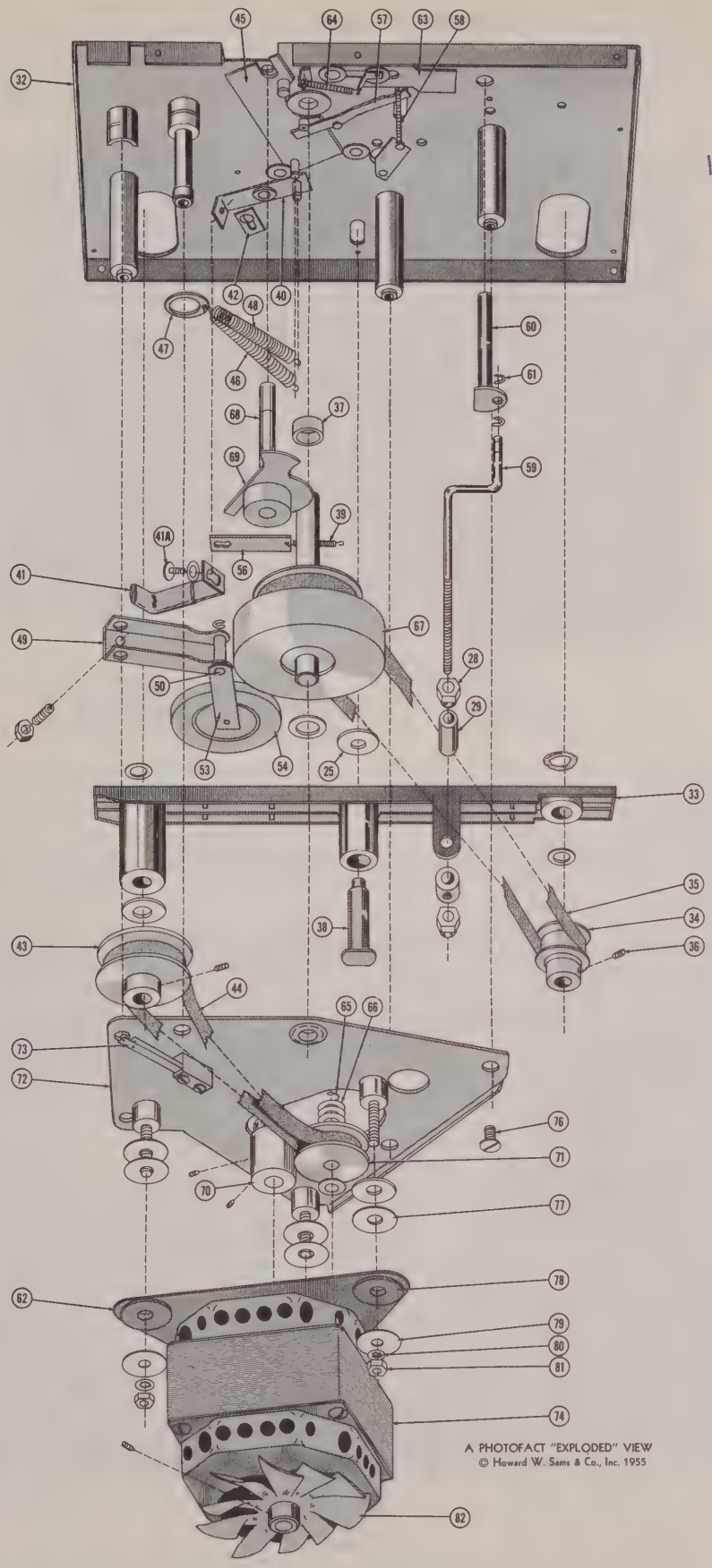
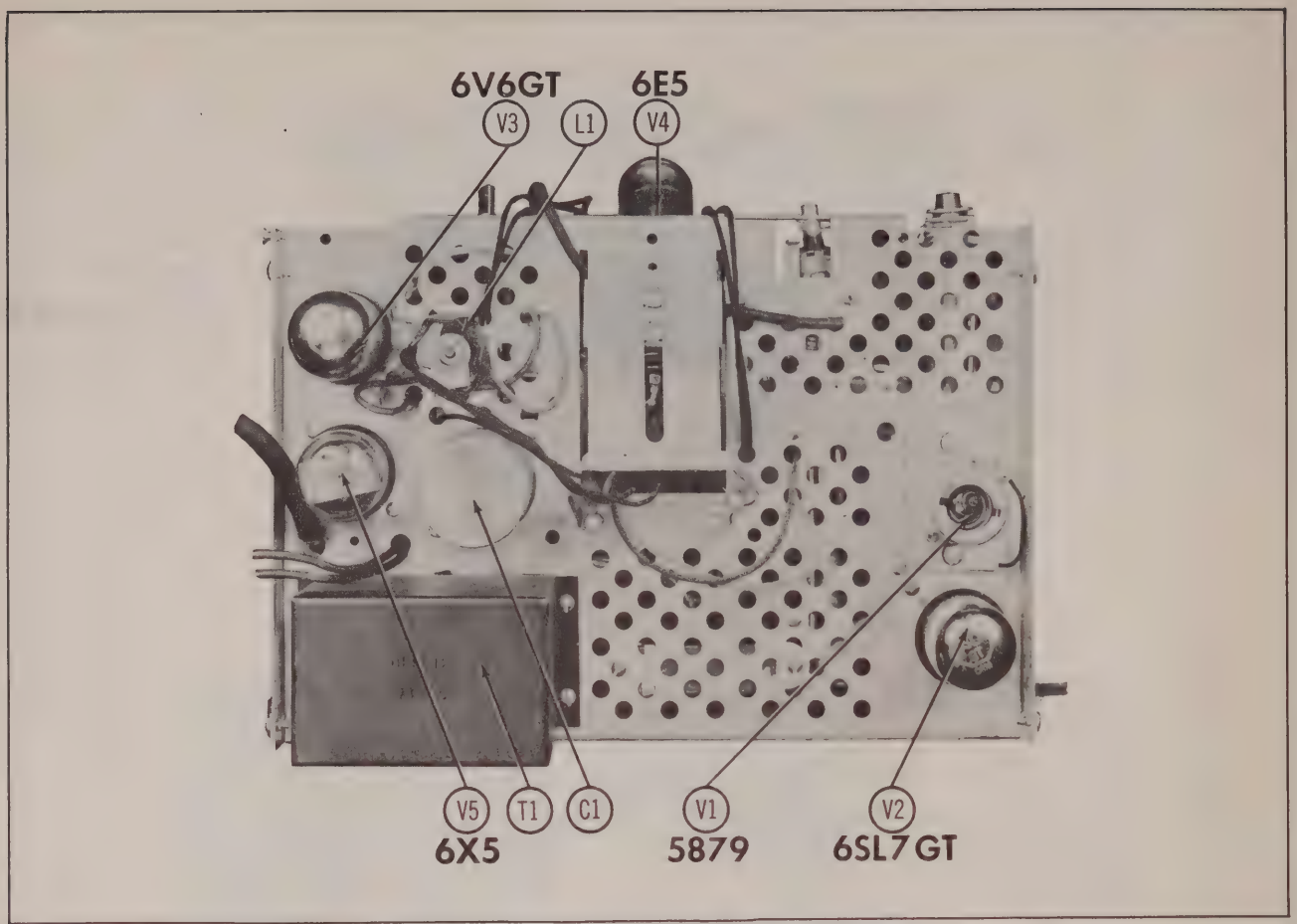
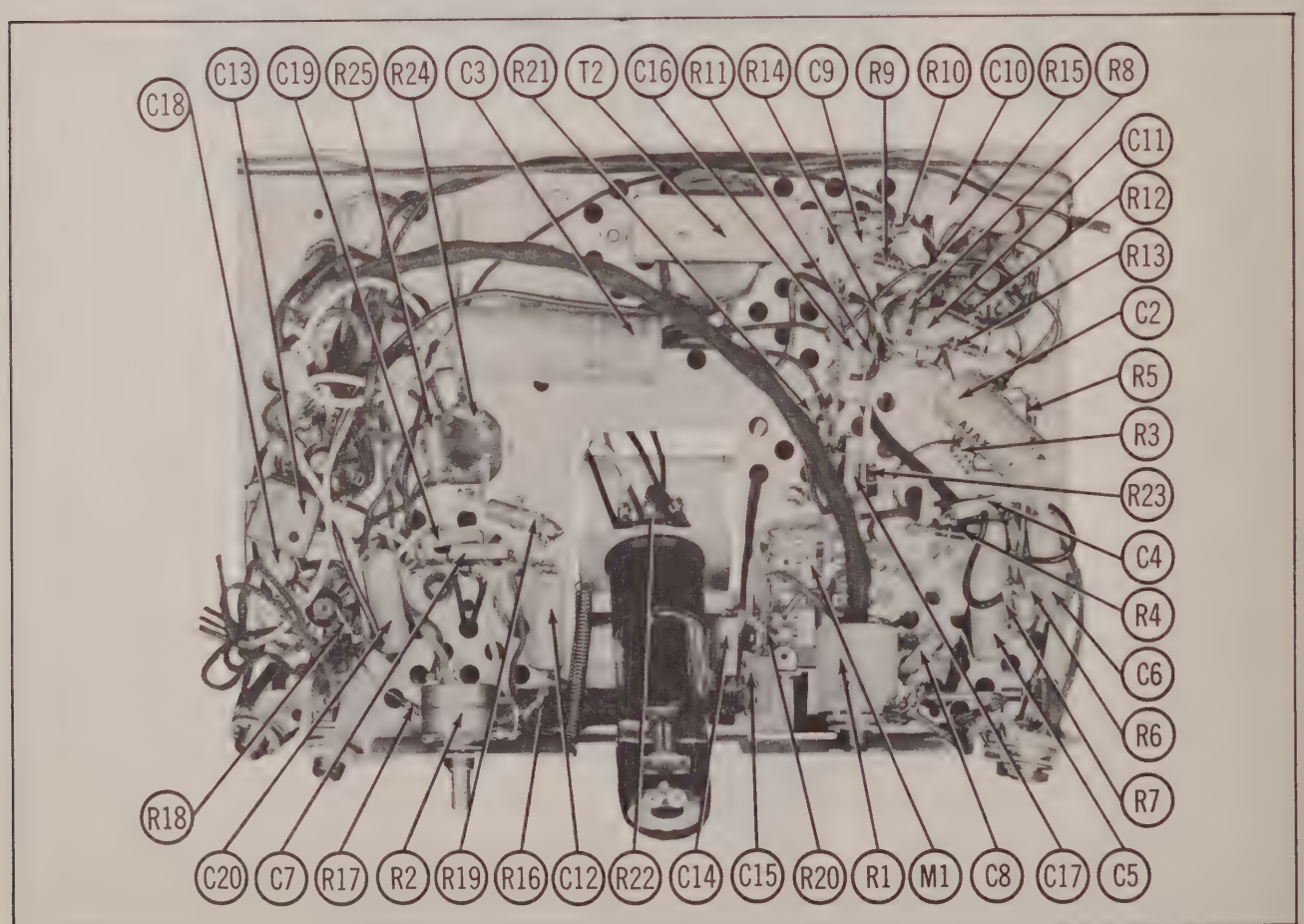


Figure 5B. Exploded View Of Parts Below Baseplate.


6V6GT
6E5
V3
L1
V4
V5
T1
C1
V1
V2
6X5
5879
6SL7GT


C13
C19
R25
R24
C3
R21
T2
C16
R11
R14
C9
R9
R10
C10
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R8
C18
C11
R12
R13
C2
R5
R3
R23
C4
R4
C6
R6
R7
R18
C20
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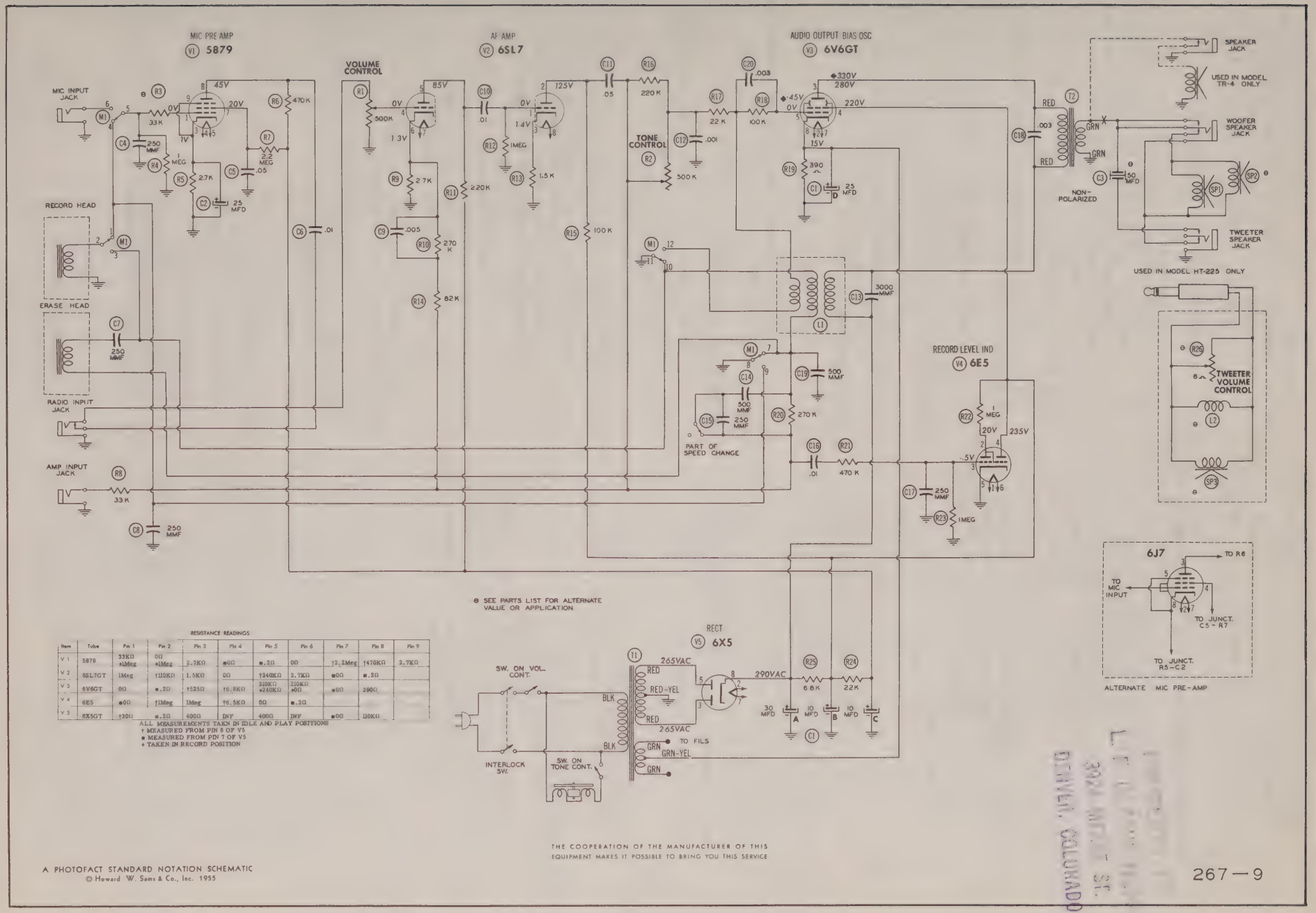
M1
C8
C17
C5



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	5879	33KΩ •1Meg	0Ω •1Meg	2.7KΩ	•0Ω	▪.2Ω	0Ω	†2.2Meg	†470KΩ	2.7KΩ
V 2	6SL7GT	1Meg	†110KΩ	1.5KΩ	0Ω	†340KΩ	2.7KΩ	•0Ω	▪.2Ω	
V 3	6V6GT	0Ω	▪.2Ω	†525Ω	†6.8KΩ	310KΩ •240KΩ	210KΩ •0Ω	•0Ω	390Ω	
V 4	6E5	•0Ω	†1Meg	1Meg	†6.5KΩ	0Ω	▪.2Ω			
V 5	6X5GT	†30Ω	▪.2Ω	400Ω	INF	400Ω	INF	•0Ω	110KΩ	

ALL MEASUREMENTS TAKEN IN IDLE AND PLAY POSITIONS
† MEASURED FROM PIN 8 OF V5
• MEASURED FROM PIN 7 OF V5
♦ TAKEN IN RECORD POSITION

THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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267—9

DENVER, COLORADO

PENTRON
MODELS HT-225, TR-4

tie rod collar (28A) inward until the tape winds properly on the "Take Up Reel" in "Wind" position.

3. Take up belt (44) worn badly or broken. Replace.

4. Take up pulley (43) loose on take up shaft (17).

Tape Winds at Fast Speed but Fails to Rewind -

1. Check the equalizer bar to see if it is adjusted properly. See "Traction" or "Drag" on Reel Spindles.

2. Tie Rod (59) out of adjustment.
a. Tie rod collar (28B) loose or located too near the front of the recorder. Move tie rod collar (28B) toward the back until the tape winds properly on the Feed Reel in the "Rewind" position.

3. Rewind belt (35) badly worn or broken. Replace.

4. Rewind pulley (34) loose. Tighten the pulley.

Tape Fails to Wind on Take Up Reel When in "Play" or "Record" Position -

1. Take Up belt (44) may be broken.

2. Rubber boot (41) not contacting equalizer bar. See Adjustment "Take Up on Take Up Reel".

3. Take up pulley (43) loose on shaft (17). Tighten.

4. Spring (46) not connected. See Figure 3.

5. Take up spindle binding. Remove and clean.

Wind-Rewind Control Operates but Play-Record Control Will Not -

1. Spring (64) not connected. If spring (64) is not connected, the automatic interlock (63) will not slide back to its normal position when the Wind-Rewind Control is turned to "Neutral," therefore preventing the Play-Record control from being turned.

Poor Recording and Playback -

1. Head Pole Piece dirty.
a. The pole pieces of the Record-Playback and Erase heads (12) and (13) are subject to an accumulation of tape coating residue, which is worn off as the tape passes the heads. This condition may render incomplete Erase and cause poor recording. This accumulation may be removed with carbon tetrachloride and a small cotton swab on the end of a tooth pick.

2. Recording tape not being held in positive contact with the heads.
a. Spring (58) not connected or broken. If this spring is loose the pressure arm lever (24) will not be actuated when the control knob is turned to either Play or Record, thereby preventing the pressure pads from bearing against the tape and in turn the pole piece of the heads. Ref. to Figures 2 and 3.

Replace or connect spring (58).

3. Wrong type of tape.
a. Use "A" tape. (Dull side of tape toward head.)
b. Red oxide plastic base tape gives the best results.

Plays Back but will not Record -

1. Defective microphone. Check microphone and connection to plug.

2. Check operation of play-record switch.

Microphonics -

1. Defective 5879 or 6SL7 tube, check 5879 tube socket for freedom of shock mounting.

Excessive Hum -

1. Check 5879 and 6SL7 tubes.

2. If hum is recorded on tape check connection to microphone or radio.

Speed Variation or "Wow" -

1. Check the motor pulley (70), idler wheel (54), flywheel-capstan (67-67A) and pressure roller (19) for oil and foreign material.
a. Clean with alcohol.

CAUTION: Do not use carbon tetrachloride to clean rubber surfaces, as carbon tetrachloride may seriously damage any rubber surface. All metal parts, however, may be cleaned with carbon tetrachloride.

2. Check to see if the pressure roller (19) is making positive contact with the capstan(67A).
a. Slide plate (45) may be binding.
b. Check spring (48) to see if it is connected.

3. Check the equalizer bar (33) to see if it is properly adjusted, see "Traction" or "Drag" on "Reel Spindle." Also the adjustment as described under "Take Up or Take Up Reel." These two adjustment may be improperly positioned, thereby causing excessive pull on the tape.

Noisy Capstan Bearing -

1. Apply a few drops of light oil to bearing.

Excessive Tape Noise -

1. Heads magnetized. Demagnetize heads with a strong 60 cycle field gradually reducing the field to zero.

MECHANICAL PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
1	611-60624	6-32 X 3/8 F. H. M. S.	41	853-20	Rubber Boot
2	611-82224	8-32 X 1 3/8 F. H. M. S.	41A		Take-up Brake Adjusting Screw
3	765-C-14	Head Cover Casting	42	711-A-209	Stop Plate
4	765-A-3	Record Lock Button	43	964-A-91	Take-up Pulley
5	611-8084-4	8-32 X 1/2 Fil. H. M. S.	44	899-3	Take-up Belt 5/16 X 12 5/8"
6	765-D-14	Front Cover Casting	45	964-A-23	Slide Plate
7	711-C-87	Top Cover Panel	46	712-A-5	Take-up Pressure Spring
8	964-A-82	Feed Reel Spindle	47	711-A-207	Spring Ring
9	611-1161-5	10-32X1" R. H. M. S.	48	712-A-6	Pressure Roller Spring
10	616-114-4	#10 Flat Washer	49	711-A-343	Idler Channel
11	714-A-102	Top Guide Sleeve	50	714-A-180	Idler Stud
12	943-A-10	Erase Head	51	619-14-6	3/16" "E" Retaining Ring
13	943-A-11	Record Head	53	711-A-362	Idler Bracket
14	616-114-4	#10 Flat Washer	54	964-A-115	Idler Wheel
15	613-1089-6	10-32X 1/2" Socket Cap Screw	56	711-A-346	Idler Spring Clip
16	611-6035-3	6-32 X 3/16" B. H. M. S.	57	711-A-330	Play Pressure Lever
17	964-A-80	Take Up Reel Spindle	58	712-A-21	Pressure Pad Spring
18	964-A-123	Speed Control Shaft	59	714-A-184	Tie Rod
18A	619-16-10	.078 X 5/8" Roll Pin	60	714-A-103	Wind and Rewind Shaft
19	964-A-116	Capstan Pressure Roller	61	619-14-6	3/16" Crescent Retaining Ring
20	616-A-3169	1/4 X 1/2 X. 010 Clock Steel Washer	62	964-A-126	Motor Plate
			63	711-A-248	Rewind Interlock Bracket
21	714-A-47	Roller Stud	64	712-A-8	Interlock Spring
22	619-14-8	1/4" Crescent Retaining Ring	65	619-A-8	1/4" Crescent Retaining Ring
23	964-A-117	Record Lock Lever	66	616-A-3169	1/4"X1/2 X. 10 Clock Steel Washer
24	964-A-114	Pressure Arm Lever	67	964-A-113	Flywheel, Complete Assembly
25	714-A-185	Equalizer Spacer	68	964-A-40	Mechanism Cam Shaft Assembly
26	742-A-11	Pressure Pad Stop	69	711-A-243	Cam
27	964-A-124	Felt Pressure Pad and Plate	70	714-A-167	Motor Pulley
27A	871-A-22	Felt Pressure Pad	71	714-A-171	Belt Pulley
28		Tie Rod Adjusting Nut	72	964-B-20	Motor Support Plate
29		Tie Rod Spacer	73	532-A-6	Equalizer Switch
30	619-14-8	1/4" Crescent Retaining Ring	74	367-B-6	G. I. Motor
31	619-14-6	3/16" Crescent Retaining Ring		714-174	Motor Bushing (For Converting to 50 cycles)
32	711-C-86	Top Mechanism Plate			
33	964-B-19	Equalizer Bar and Bearings	76	611-10554	10-32 X 5/16" B. H. M. S.
34	714-A-135	Rewind Pulley	77	711-A-341	.205 X 7/ 8" X 1/32" Motor Mounting Washer
35	899-2	Feed Belt - 5/16 X 17 1/4"			
36	613-80399	8-32 X 3/16" Allen Cup Point Set Screw	78	855-8	Shock Mounts
			79	711-A-341	.205 X 7/8" X 1/32" Motor Mounting Washer
37		Flywheel Spacer			
38	714-A-183	Equalizer Pivot Stud	80	617-8114	#3 Int. Tooth Lockwasher
39	712-A-22	Idler Spring	81	614-811-4	#8-32 Hex Head Nut
40	964-A-129	Take-up Adjusting Lever	82	717-A-20	Motor Fan (G. I. Motor)

ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
V1A	5879	5879, Mic. Pre-Amp.	C8	232-2515-2	Cap., Ceramic, 250mmf.
V1B	6J7	6J7, Alternate Mic. Pre-Amp.	C9	263-5024	Cap., Paper, .005mfd.@600V.
V2	6SL7	6SL7, AF Amp.	C10	263-1034	Cap., Paper, .01mfd.@400V.
V3	6V6GT	6V6GT, Bias Oscillator, Audio Output	C11	263-5034	Cap., Paper, .05mfd.@400V.
			C12	263-1024	Cap., Paper, .001mfd.@600V.
V4	6E5	6E5, Record Level Indicator	C13	263-3024	Cap., Ceramic, 3000mmf.
V5	6X5GT	6X5GT, Rectifier	C14	232-5015	Cap., Ceramic, 500mmf.
C1A	285-5064	Cap., Elect., 30mfd.@350V.	C15	232-2515-2	Cap., Ceramic, 250mmf.
C1B		Cap., Elect., 10mfd.@350V.	C16	263-1034	Cap., Paper, .01mfd.@400V.
C1C		Cap., Elect., 10mfd.@350V.	C17	232-2515-2	Cap., Ceramic, 250mmf.
C1D		Cap., Elect., 25mfd.@25V.	C18	263-3024	Cap., Paper, .003mfd.@600V.
C2	273-2561	Cap., Elect., 25mfd.@25V.	C19	232-5015	Cap., Ceramic, 500mmf.
C3		Cap., Elect., 50mfd., Non Polarized	C20	263-3024	Cap., Paper, .003mfd.@600V.
			R1	124-A-5043-7	Volume Control, 500KΩ, ½Watt
C4	232-2515-2	Cap., Ceramic, 250mmf.	R2	126-A-50413-4	Tone Control, 500KΩ, ½ Watt
C5	263-5034	Cap., Paper, .05mfd.@400V.	R3	111-33321	Resistor, 33KΩ, ½Watt (Not used with alternate 6J7 tube)
C6	263-1034	Cap., Paper, .01mfd.@400V.			
C7	232-2515-2	Cap., Ceramic, 250mmf.	R4	111-10521	Resistor, 1meg., ½Watt

ELECTRICAL PARTS LIST - Con't

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
R5	111-27221	Resistor, 2.7KΩ, ½Watt	R21	111-47421	Resistor, 470KΩ, ½Watt
R6	111-47421	Resistor, 470KΩ, ½Watt	R22	111-10521	Resistor, 1meg., ½Watt
R7	111-22521	Resistor, 2.2meg., ½Watt	R23	111-10521	Resistor, 1meg., ½Watt
R8	111-33321	Resistor, 33KΩ, ½Watt	R24	111-22321	Resistor, 22KΩ, ½Watt
R9	111-27221	Resistor, 2.7KΩ, ½Watt	R25	111-68231	Resistor, 6.8KΩ, 1 Watt
R10	111-27421	Resistor, 270KΩ, ½Watt	R26		Tweeter volume cont. 6Ω (Used in mod. HT225 only)
R11	111-22421	Resistor, 220KΩ, ½Watt			
R12	111-10521	Resistor, 1meg., ½Watt	T1	352-A-17	Power transformer
R13	111-15221	Resistor, 1.5KΩ, ½Watt	T2	342-A-12	Output transformer
R14	111-82321	Resistor, 82KΩ, ½Watt	SP1	345-B-13	PM speaker (3.2Ωvoice coil) (Used in model HT-225 only)
R15	111-10421	Resistor, 100KΩ, ½Watt			
R16	111-22421	Resistor, 220KΩ, ½Watt	SP2	345-B-13	PM speaker (3.2Ωvoice coil)
R17	111-22321	Resistor, 22KΩ, ½Watt	SP3		Tweeter speaker (Used in HT-225 only)
R18	111-10421	Resistor, 100KΩ, ½Watt			
R19	111-39131	Resistor, 390Ω, ½Watt	L1	311-A-13	Bias Oscillator coil
R20	111-27421	Resistor, 270KΩ, ½Watt	L2		Low pass inductance coil

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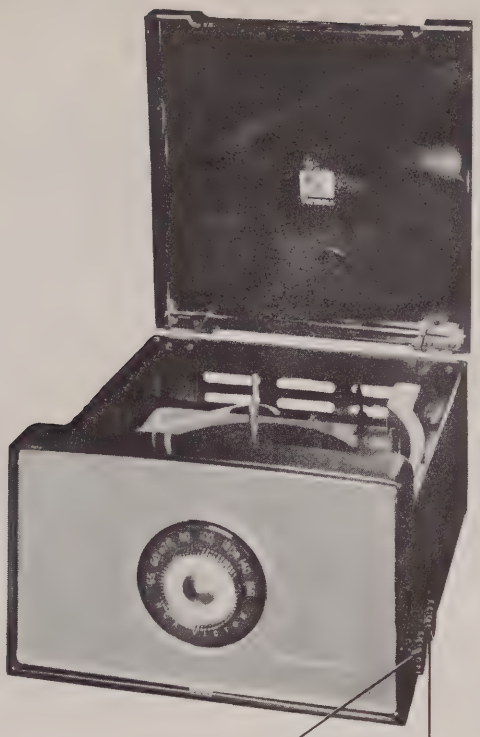
RCA VICTOR MODELS
3-US-5, A (Ch. RC-1130)



RCA VICTOR MODELS
3-US-5, A (Ch. RC-1130)

TRADE NAME	RCA Victor Models 3-US-5, 3-US-5A (Ch. RC-1130)
MANUFACTURER	Radio Corp. of America, Radio & "Victrola" Div., Camden 2, N.J.
TYPE SET	AC Operated Radio-Phono Combination AM Superheterodyne Receiver With 3 Speed Automatic Record Changer
TUBES (Five)	Types 12BE6 Conv., 12BA6 IF Amp., 12AV6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles
RATING	.23 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Turn function switch to 3rd. position right (radio).

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to pin 1 (grid) of 12BA6 (V2). Low side to B-.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	"	"	"	A3, A4	"
3.	"	Loop	1620KC	Tuning gang fully open	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
4.		"	1400KC	Tune to 1400KC signal	"	A6	"
5.		"	600KC	Tune to 600KC signal	"	A7	Adjust for maximum output while rocking tuning gang thru 600KC signal. If necessary, repeat steps 3, 4 and 5. Readjust A6 for maximum output after chassis has been placed in cabinet.

RECORD CHANGER UNIT RCA MODEL RP-198-1

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

RCA VICTOR
MODEL 3-US-5 (Ch. RC-1130)

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		RCA Victor PART No.	STANDARD REPLACEMENT		
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amplifier	12BA6	12BA6	7BK	
V3	Det.-AVC-AF Amp.	12AV6	12AV6	7BT	
V4	Output	50C5	50C5	7CV	
V5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	RCA Victor PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	80	150	74662	PRS150/80-40		BBRD8415		TCD498	TVA-3451	
B	50	150								
C2	68		78283	SI68	D6-680	TP32	GP1K-680	UC-5468	5GA-Q68	
C3	.047	400	73553	P488-047	DF-503	CUB4S47		PT4147	4TM-S47	
C4	150	500	39632	1468-151	D6-151	5W5T15	GP2K-151	MC236	1FM-315	
C5	.0033	600	73795	P688-0033	D6-332	CUB6D33	GP2-333-332	PT6233	6TM-D33	
C6	.0022	600	73595	P688-0022	D6-222	CUB6D22	GP2-333-222	PT6222	6TM-D22	
C7	.047	400	73553	P488-047	DF-503	CUB4S47		PT4147	4TM-S47	
C8	680		78305	SI680	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	
C9	.0039	400	73796	P688-004	D6-392	CUB6D4	GP2-333-392	PT624	6TM-D4	
C10	.01	400	73561	P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C11	330	500	72571	1468-331	D6-331	5W5T33	GP2K-331		5GA-T33	
C12	.0027	600	73599			PM6D27				
C13	.0047	400	73920	P688-0047	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C14	.0047	400	73920	P688-0047	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C15	.047	400	73553	P488-047	DF-503	CUB4S47		PT4147	4TM-S47	
C16	.047	400	73553	P488-047	DF-503	CUB4S47		PT4147	4TM-S47	

CONTROLS

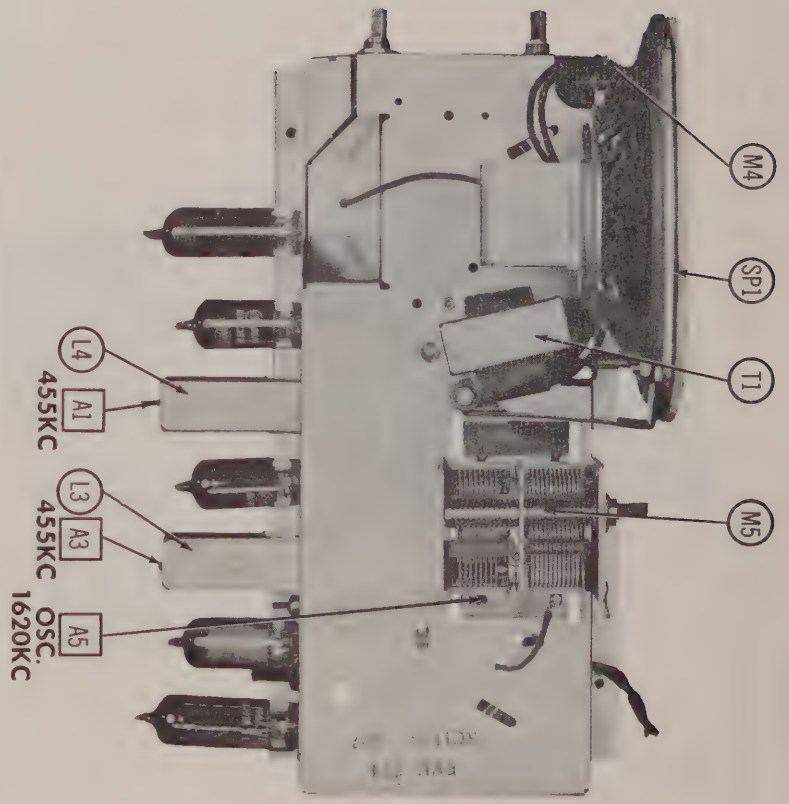
ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	RCA Victor PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1	2Meg	½	78280	Q13-139X		BT-79	UT-454	Volume tapped at 350KΩ

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	RCA Victor PART No.	IRC PART No.	
R2	22KΩ	½	503322	BTS-22K	
R3	100Ω	½	503110	BTS-100	
R4	100Ω	½	503110	BTS-100	
R5	47KΩ	½	503347	BTS-47K	
R6	470KΩ	½	503447	BTS-470K	
R7	3.3Meg	½	503533	BTS-3.3Meg	
R8	1Meg	½	503510	BTS-1Meg	
R9	82KΩ	½	503382	BTS-82K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	RCA Victor PART No.	IRC PART No.	
R10	3.3Meg	½	503533	BTS-3.3Meg	
R11	10Meg	½	503610	BTS-10Meg	
R12	220KΩ	½	503422	BTS-220K	
R13	470KΩ	½	503447	BTS-470K	
R14	150Ω	½	503115	BTS-150	
R15	1200Ω	1	513212	BTA-1200	
R16	33Ω	½	513033		

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA: RCA Victor PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T1	2.4KΩ	3.3Ω	78368	A-3336	A-3031		Z1102	24S50A	

SPEAKER

ITEM No.	RATINGS: SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA: RCA Victor PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1	5 1/4"	PM	3.2Ω	77539	ST-803 Mod. P525-V	52A1	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: RCA Victor PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Loop Ant.	1.6Ω		78282				Complete with bracket
L2	Osc. Coil	.7Ω	5.8Ω	75485	14-1060		70-Osc.	
L3	Input IF	18Ω	18Ω	75486	16-6758	BC-352	12-C1	
L4	Output IF	15Ω	15Ω	75487	16-6770	BC-355	12-C6	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA: RCA Victor PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	SHURE PART No. CARTRIDGE	SHURE PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. NEEDLE	REMARKS
M1	77779					46	0-1 or S-1 and 0-3	

AS ELECTRO-VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENT SEE BELOW.

PHONO NEEDLE

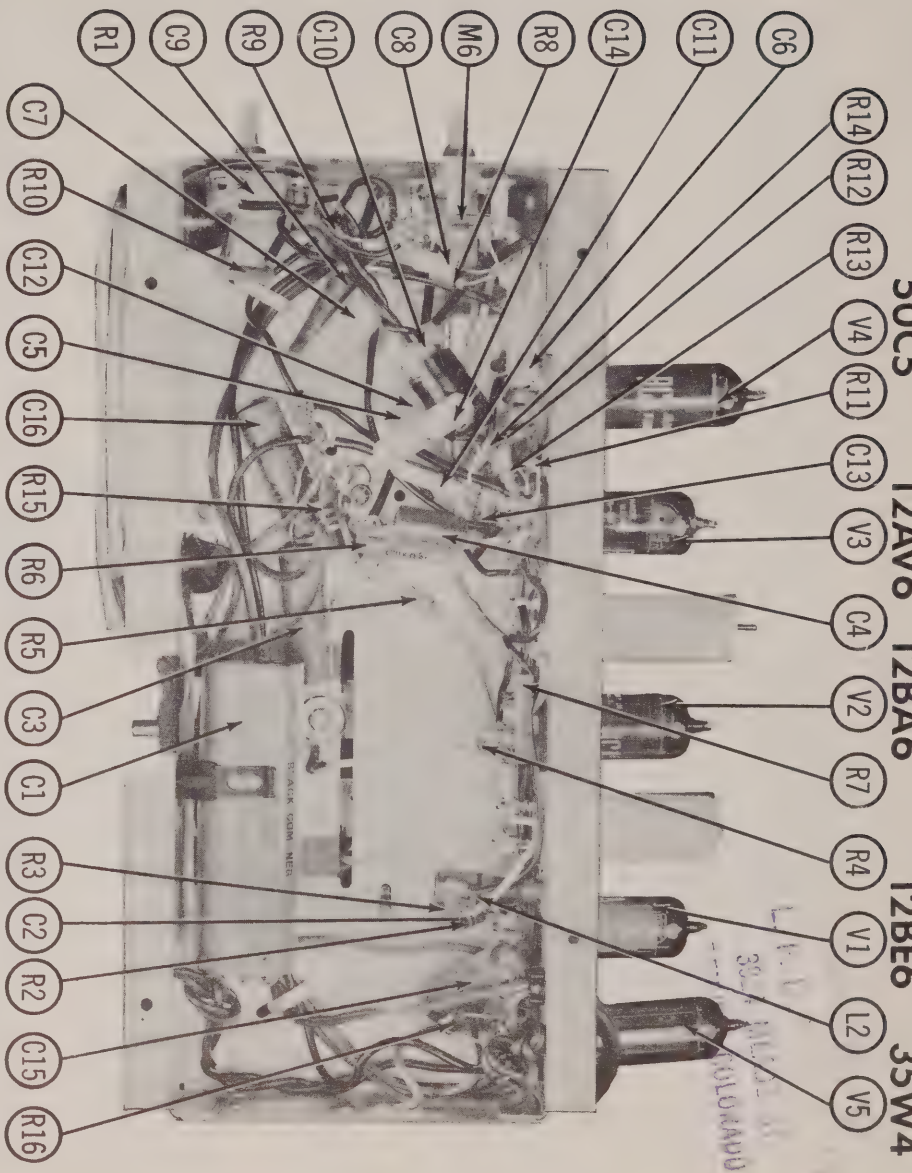
(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA: RCA Victor PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	REMARKS
M2	77899 (33 1/3-45 Needle)	†M-74LP or ♦M-74LPD	*A-437 or †A-435 or ♦A-435D	†W-44MGS or ♦W-44MGD	* Metal † Jewel ♦ Diamond
M3	75497 (78 RPM Needle)	†M-74 or ♦M-74D	*C-436 or †C-401 or ♦C-401D	†W-44S or ♦W-44D	

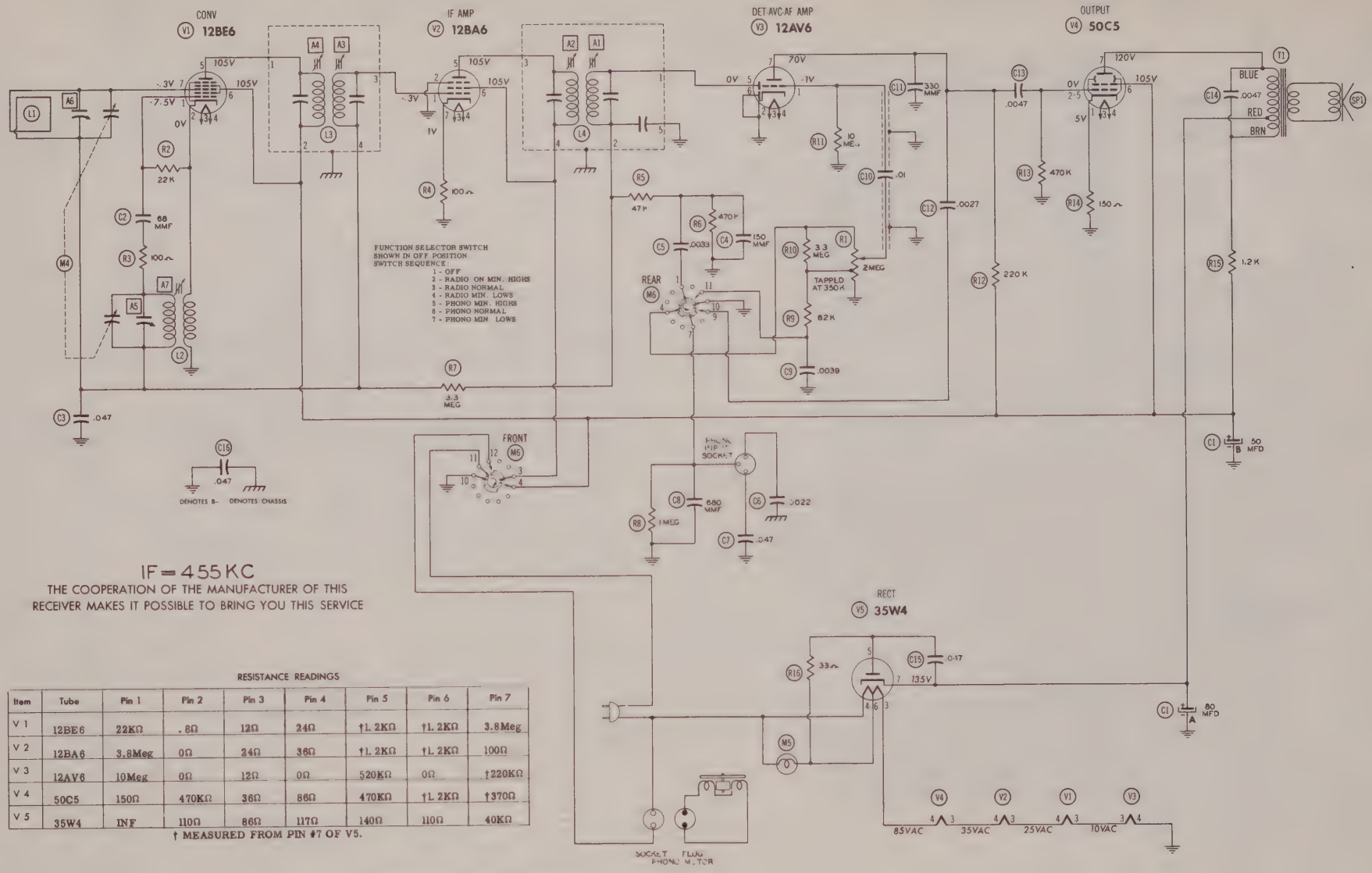
MISCELLANEOUS

ITEM No.	PART NAME	RCA Victor PART No.	NOTES
M4	Dial Light	31480	#47, Bayonet
M5	Tuning Cap.	78279	10-370MMF; 15-120MMF.
M6	Switch	78281	Function & Power Switch
	Cabinet	Y2531	Less Lid - Model 3-US-5
	Cabinet	Y2683	Less Lid-Model 3-US-5A
	Lid	78298	Cabinet
	Knob	78294	Function Switch
	Knob	78293	Tuning - Includes Station Pointer
	Knob	77140	Volume
	Dial Scale	78291	

CHASSIS—BOTTOM VIEW



RCA VICTOR MODEL 3-US-5 (Ch. RC-1130)



IF = 455 KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.8Ω	12Ω	24Ω	†1.2KΩ	†1.2KΩ	3.8Meg
V 2	12BA6	3.8Meg	0Ω	24Ω	36Ω	†1.2KΩ	†1.2KΩ	100Ω
V 3	12AV6	10Meg	0Ω	12Ω	0Ω	520KΩ	0Ω	†220KΩ
V 4	50C5	150Ω	470KΩ	36Ω	86Ω	470KΩ	†1.2KΩ	†370Ω
V 5	35W4	INF	110Ω	86Ω	117Ω	140Ω	110Ω	40KΩ

† MEASURED FROM PIN #7 OF V5.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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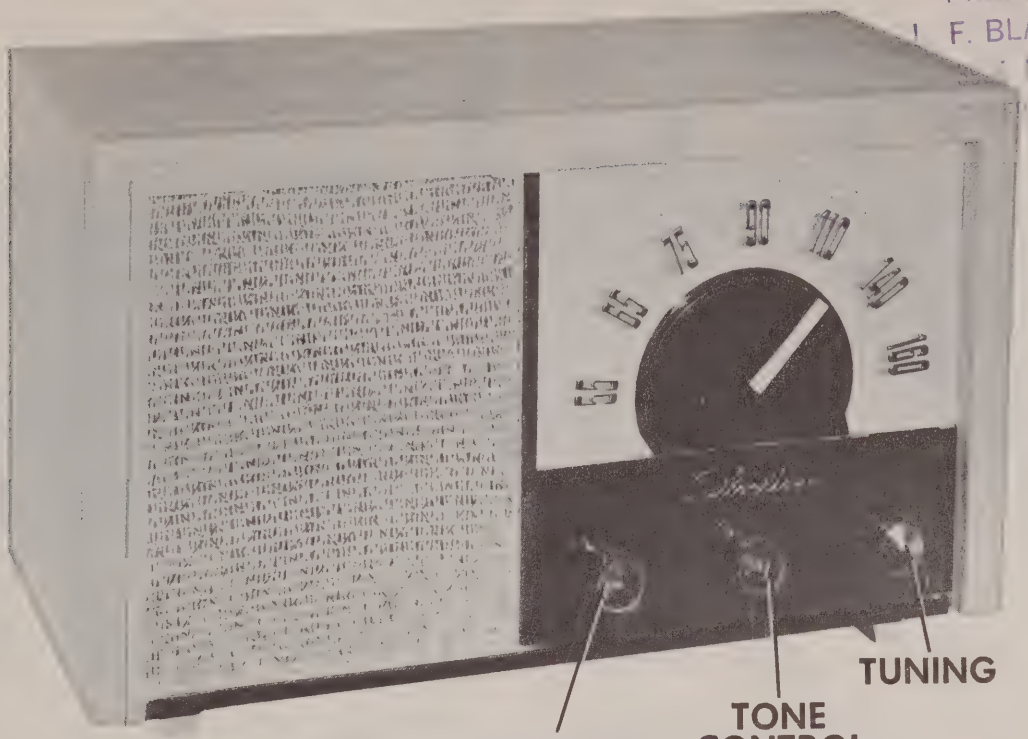
SILVERTONE MODELS
4016, 4017 (Ch. 757.150)



SILVERTONE MODELS
4016, 4017 (Ch. 757.150)

TRADE NAME	Silvertone Models 4016, 4017 (Ch. 757.150)
SUPPLIER	Sears, Roebuck & Co., 925 S. Homan, Chicago, Ill.
TYPE SET	AC-DC Operated AM Superheterodyne Receiver With Phono Provisions
TUBES (Six)	Types 12BA6 RF Amp., 12BE6 Conv., 12BA6 IF Amp., 12AV6 Det.-AVC-AF Amp., 35L6GT Output, 35W4 Rectifier
POWER SUPPLY	105-120 Volts AC-DC RATING .26 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535KC-1640KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
To set pointer, turn tuning capacitor fully closed and set pointer parallel with base of cabinet.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05MFD	High side to pin 7 (grid) of 12BE6 (V2) Low side to B-.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	"	1640KC	"	"	A5	"
3.		Loop	1400KC	Tune to 1400KC signal	"	A6, A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
4.		"	600KC	Tune to 600KC signal	"	A8	"

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		Silvertone PART No.	STANDARD REPLACEMENT		
V1	RF Amplifier	12BA6	12BA6	7BK	
V2	Converter	12BE6	12BE6	7CH	
V3	IF Amplifier	12BA6	12BA6	7BK	
V4	Det.-AVC-AF Amp	12AV6	12AV6	7BT	
V5	Output	35L6GT	35L6GT	7S	
V6	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	Silvertone PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	60	150	E324	PRS150/50-30-20		BBRD5315 BR2015		TCT-3117	TVA-3455	
B	30	150								
C	20	150								
C2	.05	400	E306A	P488-05	DF-503	CUB4S5		PT415	4TM-S5	
C3A	220									
B	2000									
C	5000		♦E3015	♦PA-113-1	♦PC-150	♦116TM1	♦1408-01		♦DT-1	
D	250									
E										
C4	2000		E332	BPD-002	DD-202	K072	801-002	DC-522	5HK-D2	
C5	.01	600	E301	P688-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	
C6	.05	400	E306A	489ZX-05	DF-503	PJ4S5		PT415	4TM-S5	
C7	.05	400	E306A	489ZX-05	DF-503	PJ4S5		PT415	4TM-S5	

♦ Items C3A, C3B, C3C, C3D, C3E, R7A, R7B and R7C are combined in one unit.
When replacing items separately items C3D and C3E should total 250MMF.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Silvertone PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	500KΩ	½	E254	Q13-133	A47-500K-Z	BSK-60-S	U-48	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWE-12	Not Req.	US-26	Attach to R1A
R2A	1Meg	½	E257	Q11-137	A47-1Meg-S	AB-69	U-54	Tone
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R2A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Silvertone PART No.	IRC PART No.	
R3	220Ω	½		BTS-220	
R4	22KΩ	½		BTS-22K	
R5	150Ω	½		BTS-150	
R6	3.3Meg	½		BTS-3.3Meg	

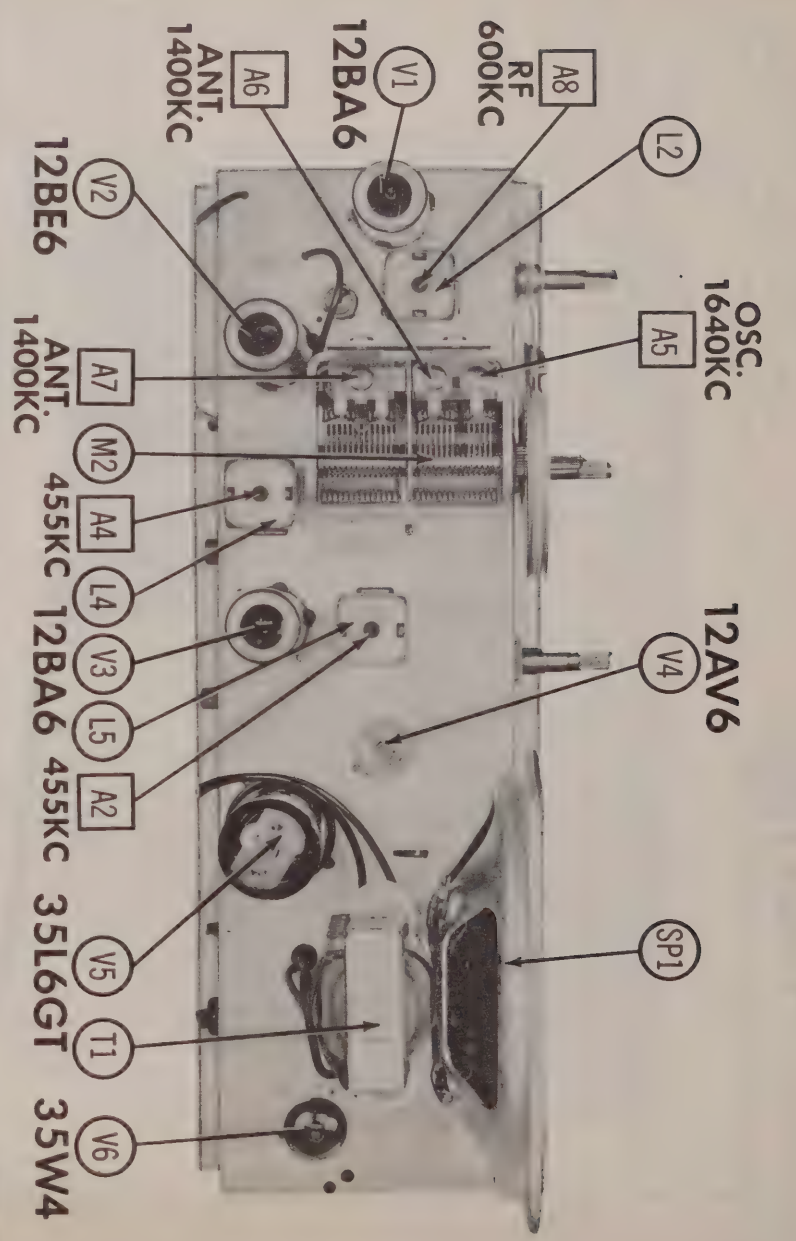
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Silvertone PART No.	IRC PART No.	
R7A	6.8Meg	½	♦E3015	BTS-6.8Meg	
B	470KΩ	½		BTS-470K	
C	470KΩ	½		BTS-470K	
R8	120Ω	½		BTS-120	
R9	1000Ω	1		BTA-1000	
R10	22Ω	½		BTS-22	Note 1

♦ Items R7A, R7B, R7C, C3A, C3B, C3C, C3D,3CE are combined in one unit.
Note 1. Not used in some versions.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	Silvertone PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T1	2.3KΩ	3.6Ω	Part of Spkr.	A-3330	A-3031		Z1102	24S50A	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	Silvertone PART No.	JENSEN PART No.	QUAM PART No.	
SP1	5 1/4"	PM	3.6Ω	E-105	ST-803 Mod. P525-V	52A1	

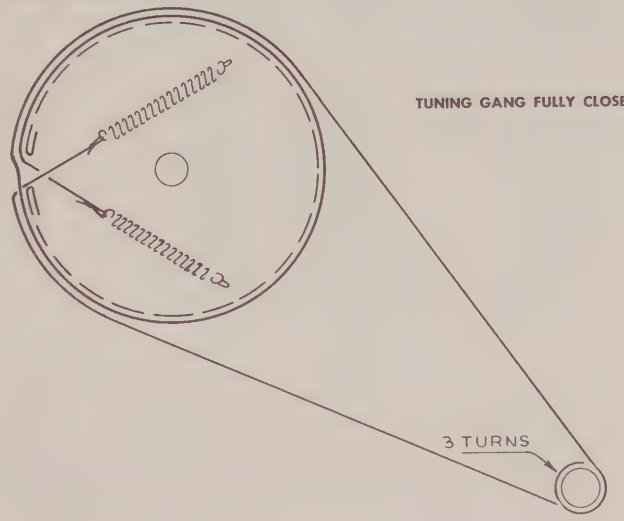
COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	Silvertone PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	3Ω		E605				Includes cabinet back
L2	RF Coil	108Ω	10Ω*	E626182				
L3	Osc. Coil	.5Ω	7.5Ω	E6111	14-1073 ■		69-Osc.▲	
L4	Input IF	15Ω	15Ω	E6256	16-6758	BC-352	12-C1	
L5	Output IF	10Ω	10Ω	E62419	16-6758	BC-353	12-C2	

* Tapped ② 6.7Ω
■ Leads sufficient mounting support.
▲ Drill new mounting hole.

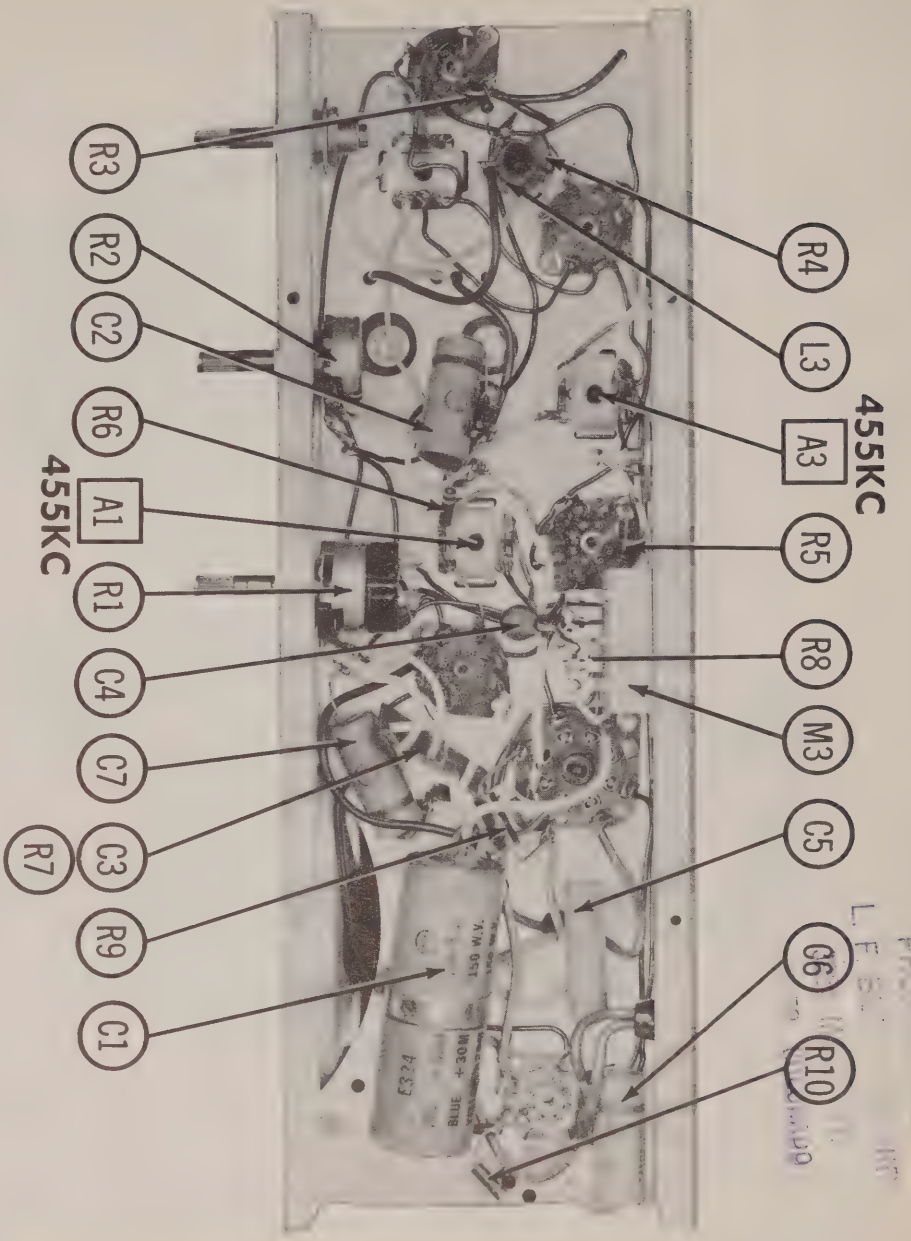
MISCELLANEOUS

ITEM No.	PART NAME	Silvertone PART No.	NOTES
M1	Dial Light	E47	#47, Bayonet
M2	Tuning Cap.	E357	35-435MMF, 14-240MMF, 14-105MMF
M3	Switch	E123	Radio-Phono
	Knob	E5017	Pointer
	Knob	E5012	Volume, tone, tuning
	Face	E717	Front, clear with calibration, etc
	Face	E718	Translucent with knob hole

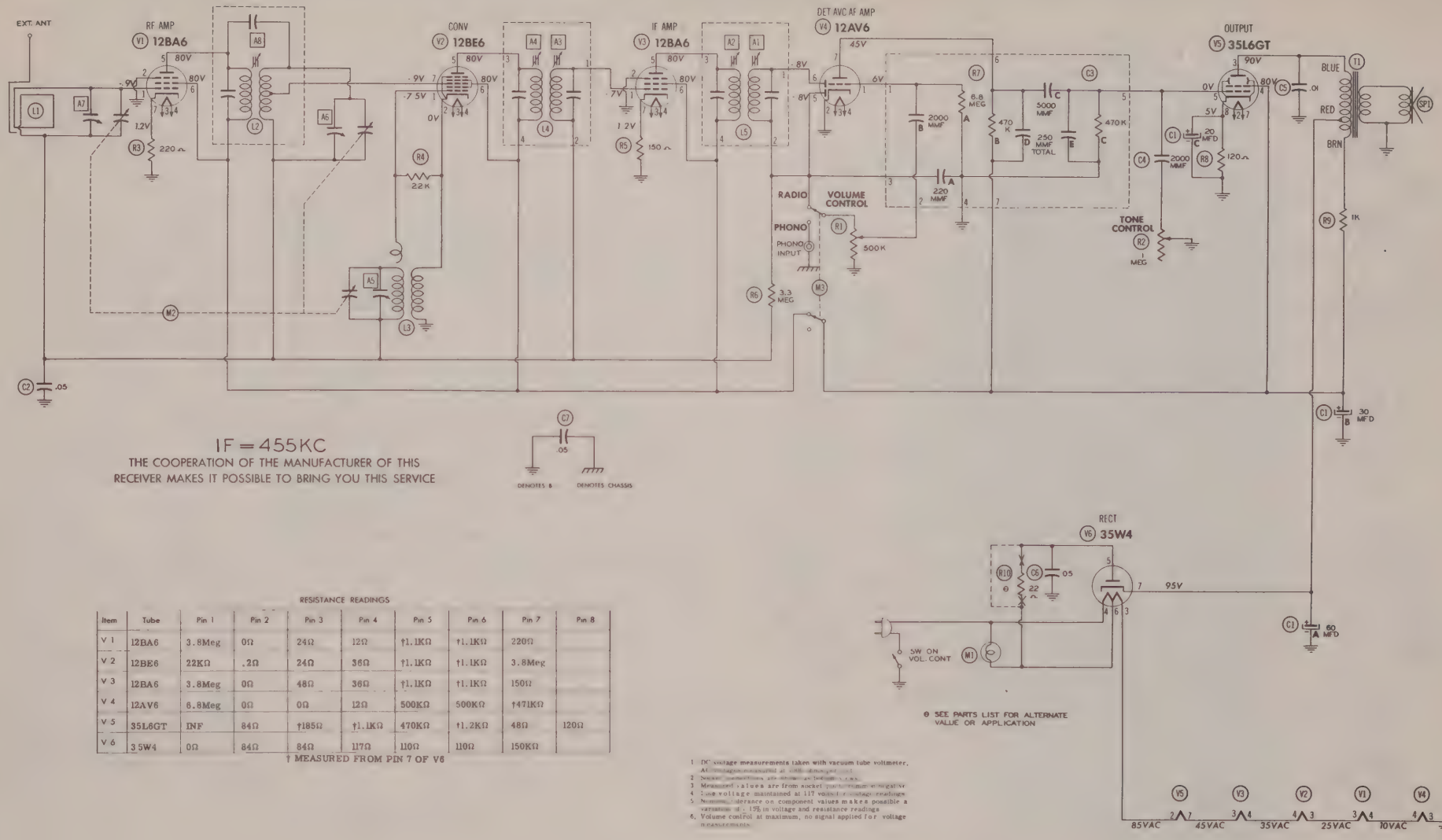


DIAL CORD STRINGING

CHASSIS—BOTTOM VIEW



SILVERTONE MODEL 4016 (Ch. 757.150)



IF = 455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

C7 .05

DENOTES B+ DENOTES CHASSIS

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	12BA6	3.8Meg	0Ω	24Ω	12Ω	†1.1KΩ	†1.1KΩ	220Ω	
V 2	12BE6	22KΩ	.2Ω	24Ω	36Ω	†1.1KΩ	†1.1KΩ	3.8Meg	
V 3	12BA6	3.8Meg	0Ω	48Ω	36Ω	†1.1KΩ	†1.1KΩ	150Ω	
V 4	12AV6	6.8Meg	0Ω	0Ω	12Ω	500KΩ	500KΩ	†471KΩ	
V 5	35L6GT	INF	84Ω	†185Ω	†1.1KΩ	470KΩ	†1.2KΩ	48Ω	120Ω
V 6	35W4	0Ω	84Ω	84Ω	117Ω	110Ω	110Ω	150KΩ	

† MEASURED FROM PIN 7 OF V6

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Set to [illegible]
3. Measured values are from socket [illegible]
4. Line voltage maintained at 117 volts [illegible]
5. Normal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

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SILVERTONE MODEL
4032 (Ch. 757.300)

SILVERTONE MODEL
4032 (Ch. 757.300)

TRADE NAME	Silvertone Model 4032 (Ch. 757.300)
SUPPLIER	Sears, Roebuck & Co., 925 South Homan St., Chicago, Illinois
TYPE SET	AC Operated Radio Phono Combination AM Superheterodyne Receiver With 3 Speed Manual Record Player
TUBES (Five)	Types 12BE6 Conv., 12BA6 IF Amp., 12AV6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	105-120 Volts AC-60 Cycles — RATING .24 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535KC-1640KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
To set pointer, turn tuning capacitor fully closed and set pointer parallel with base of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	"	1640KC	"	"	A5	"
3.		Loop	1400KC	Tune to 1400KC signal	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1955 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

SILVERTONE
MODEL 4032 (Ch. 757. 300)

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: Silvertone PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amplifier	12BA6	12BA6	7BK	
V3	Det.-AVC-AF Amp	12AV6	12AV6	7BT	
V4	Output	50C5	50C5	7CV	
V5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: Silvertone PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	70	150	E323	PRS150/80-40		BBRD8415		TCT3115	TVA-2460	
B	30	150								
C2	.05	400	E306A	P488-05	DF-503	CUB4S5		PT415	4TM-S5	
C3	.05	400	E306A	P488-05	DF-503	CUB4S5		PT415	4TM-S5	
C4A	220		♦E3015	♦PA-113-1	♦PC-150	♦116TM1	♦1408-01		♦DT-1	
B	.002									
C	.005									
D	250									
E										
C5	.01	600	E301	P688-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	
C6	.047	400		P488-047	DF-503	CUB4S47		PT4147	4TM-S47	
C7	.05	400	E306A	P488-05	DF-503	CUB4S5		PT415	4TM-S5	
C8	.01	600	E301	P688-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	

♦ Items C4A, C4B, C4C, C4D, C4E, R5A, R5B, R5C are combined in one unit.
When replacing items separately, C4D and C4E should total 250MMF.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: Silvertone PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500KΩ	½	E253	Q13-133	A47-500K-Z	B8K-60-S	U-48	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWE-12	Not Req.	US-26	Attach to R1A

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Silvertone PART No.	IRC PART No.	NOTES
R2	22KΩ	½		BTS-22K	
R3	180Ω	½		BTS-180	
R4	3.3Meg	½		BTS-3.3Meg	
R5A	6.8Meg	½		BTS-6.8Meg	
B	470KΩ	½	♦E3015	BTS-470K	
C	470KΩ	½		BTS-470K	

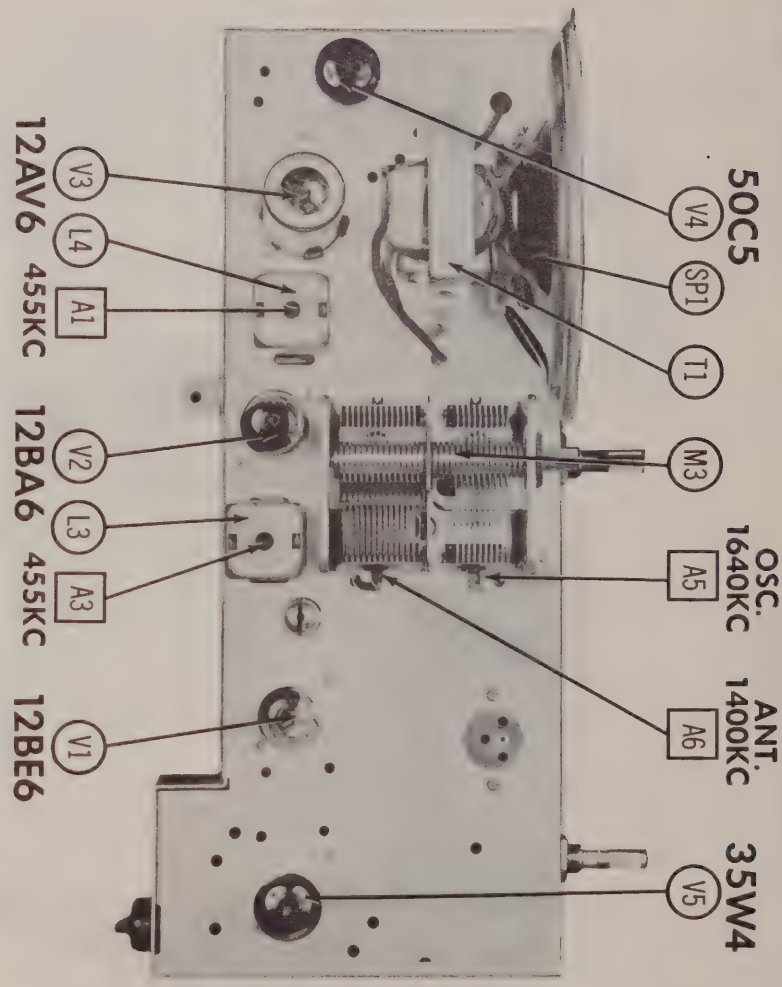
ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Silvertone PART No.	IRC PART No.	NOTES
R6	120Ω	½		BTS-120	
R7	1500Ω	1		BTA-1500	
R8	22Ω	½		BTS-22	

♦ Items R5A, R5B, R5C, C4A, C4B, C4C, C4D, C4E are combined in one unit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC.	REPLACEMENT DATA: Silvertone PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T1	2.3KΩ	3.3Ω	Part of Spkr.	A-3330 ①	A-3031 ①		Z1102①	24S50A ①	① Drill one new mounting hole, bend on the tab under and solder

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	Silvertone PART No.	JENSEN PART No.	QUAM PART No.	
SP1	4"	PM	3.3Ω	E106	ST-113 Mod. P4-X	4A07	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	Silvertone PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	2.7Ω		E604				
L2	Osc. Coil	.5Ω	5.5Ω	E617	14-1073 *		69-Osc. ■	Tertiary winding
L3	Input IF	17Ω	17Ω	E622	16-6758	BC-352	12-C1	
L4	Output IF	17Ω	17Ω	E622	16-6758	BC-353	12-C2	

* Leads sufficient mounting support.
■ Drill new mounting hole.

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA							REMARKS
	Silvertone PART No.	ASTATIC PART No.		SHURE PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1	E812	GC-AG-J	G-AG	WC36B	A56U	43	0-2 or S-2	

ASTATIC, SHURE AND ELECTRO-VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGES LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENT SEE BELOW.

PHONO NEEDLE

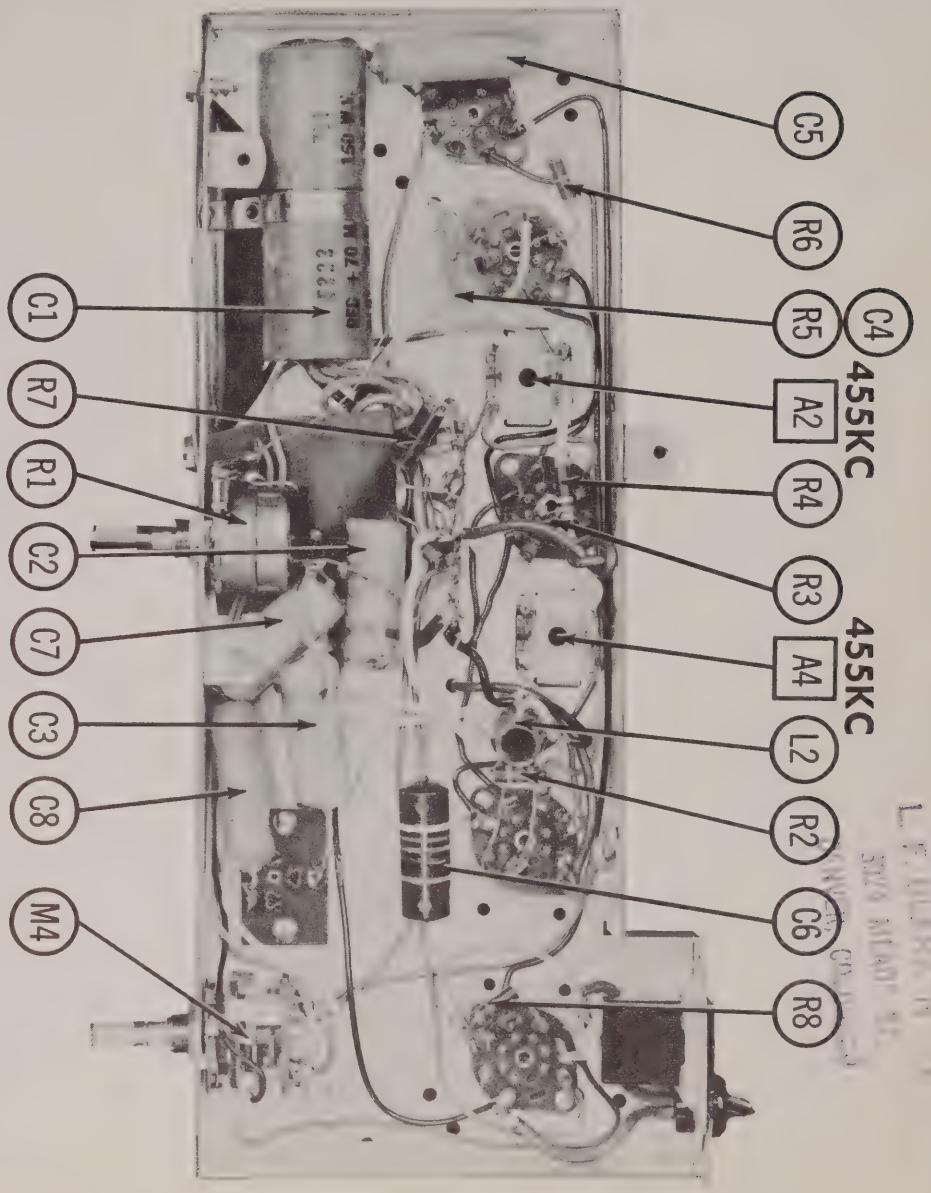
(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA				REMARKS
	Silvertone PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	
M2	E813	†W-3AGA or *W-3AGS or ♦ W-3AGD	†B-326 or *B-334 or ♦B-334D	†A-842 or *A-742 or ♦A-742D	* Metal † Jewel ♦ Diamond

MISCELLANEOUS

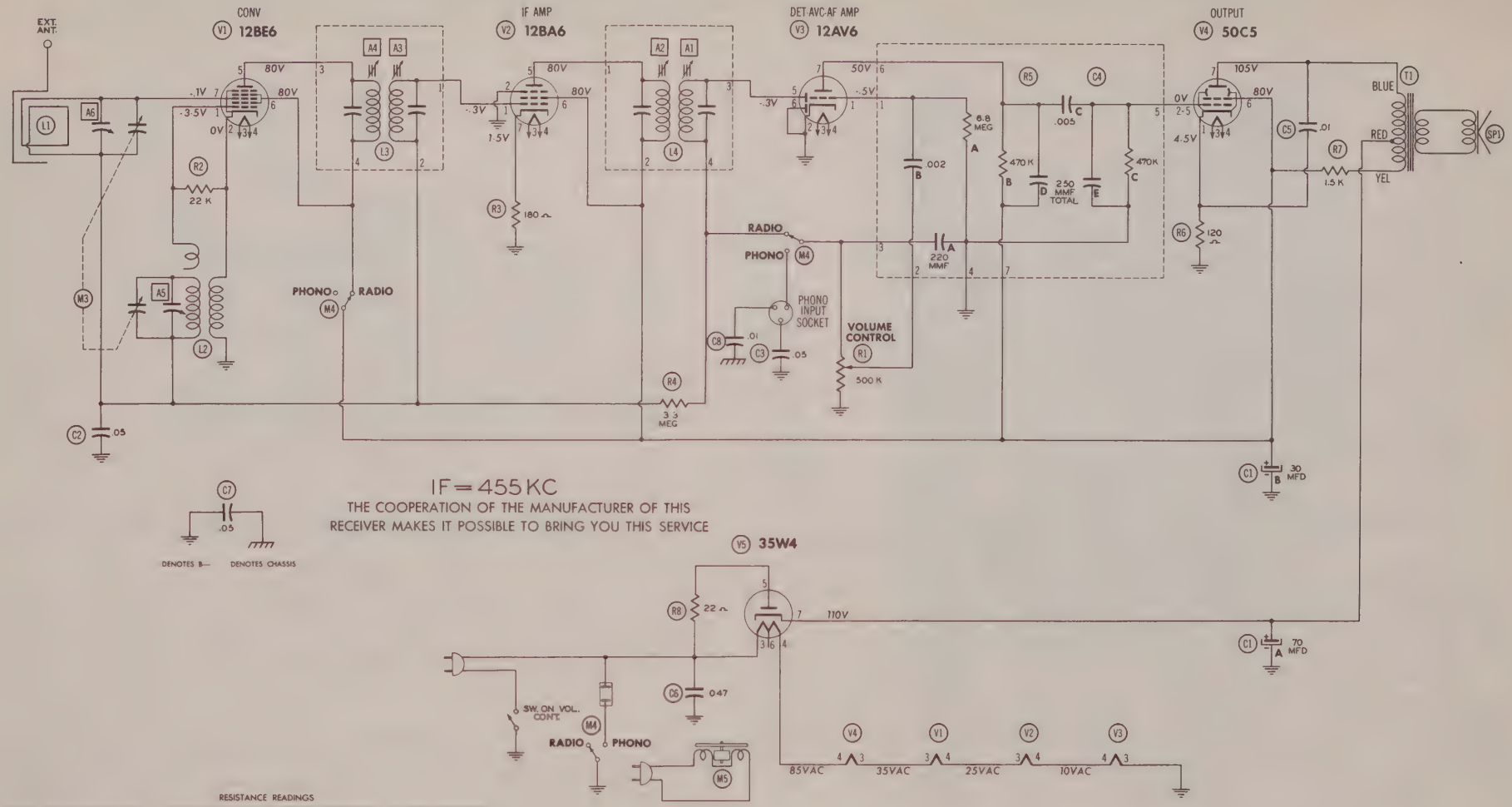
ITEM No.	PART NAME	Silvertone PART No.	NOTES
M3	Tuning Cap.	E351-1	25-460MMF, 25-182MMF
M4	Switch	E122	Radio-Phono
M5	Phono Motor	E800	3 Speed
	Cabinet	E7013	Less front
	Cabinet	E7014	Front
	Knob	E5011	Tuning
	Knob	E5010	On-off-volume and selector

CHASSIS—BOTTOM VIEW



SILVERTONE MODEL 4032 (Ch. 757.300)

SILVERTONE MODEL 4032 (Ch. 757.300)



C7 .05

DENOTES B— DENOTES CHASSIS

IF = 455 KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.2Ω	36Ω	24Ω	†1.5KΩ	†1.5KΩ	3.8Meg
V 2	12BA6	3.8Meg	0Ω	24Ω	12Ω	†1.5KΩ	†1.5KΩ	180Ω
V 3	12AV6	6.8Meg	0Ω	0Ω	12Ω	500KΩ	0Ω	470KΩ
V 4	50C5	120Ω	INF	36Ω	85Ω	470KΩ	†1.5KΩ	†185Ω
V 5	35W4	139Ω	INF	117Ω	85Ω	117Ω	110Ω	70KΩ

† MEASURED FROM PIN 7 OF V5

1. DC voltage measurements taken with vacuum tube voltmeter. AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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PHOTOFACT* Folder

*TRADE MARK

RETMA MEMBER

SILVERTONE MODELS 4142H, 4149H, 5118, 5132, 5139, 5149 (Ch. 528.31900, 528.31901, 528.32000, 528.32001)

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SILVERTONE MODELS 4142H, 4149H, 5118, 5132, 5139, 5149 (Ch. 528.31900, 528.31901, 528.32000, 528.32001)

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DATE 2–55 SET 267 FOLDER 13

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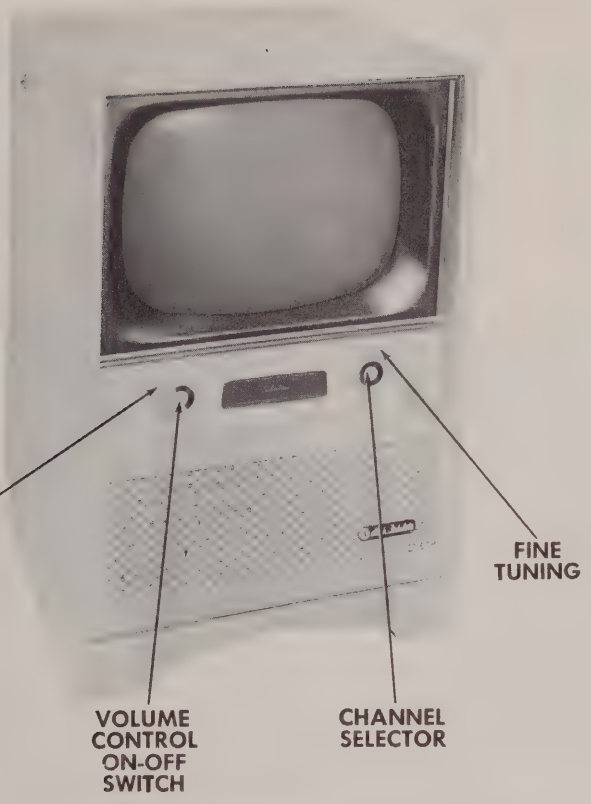
L. F. B
3924 M
DENVER, COLORADO



SILVERTONE MODEL 4142H

TRADE NAME	Silvertone	MODELS	CHASSIS
		5118, 5132	528.31900, 528.31901
		4142H, 4149H, 5139	528.32000, 528.32001
		4152H, 5149	528.32001
SUPPLIER	Sears Roebuck & Co., 925 S. Homan Ave., Chicago, Illinois		
TYPE SET	Television Receiver		
TUBES	Twenty-One		
POWER SUPPLY	110-120 Volts AC - 60 Cycle	RATING 1.6 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13, Video IF 26.25MC, Sound IF 21.75MC (Intercarrier)		

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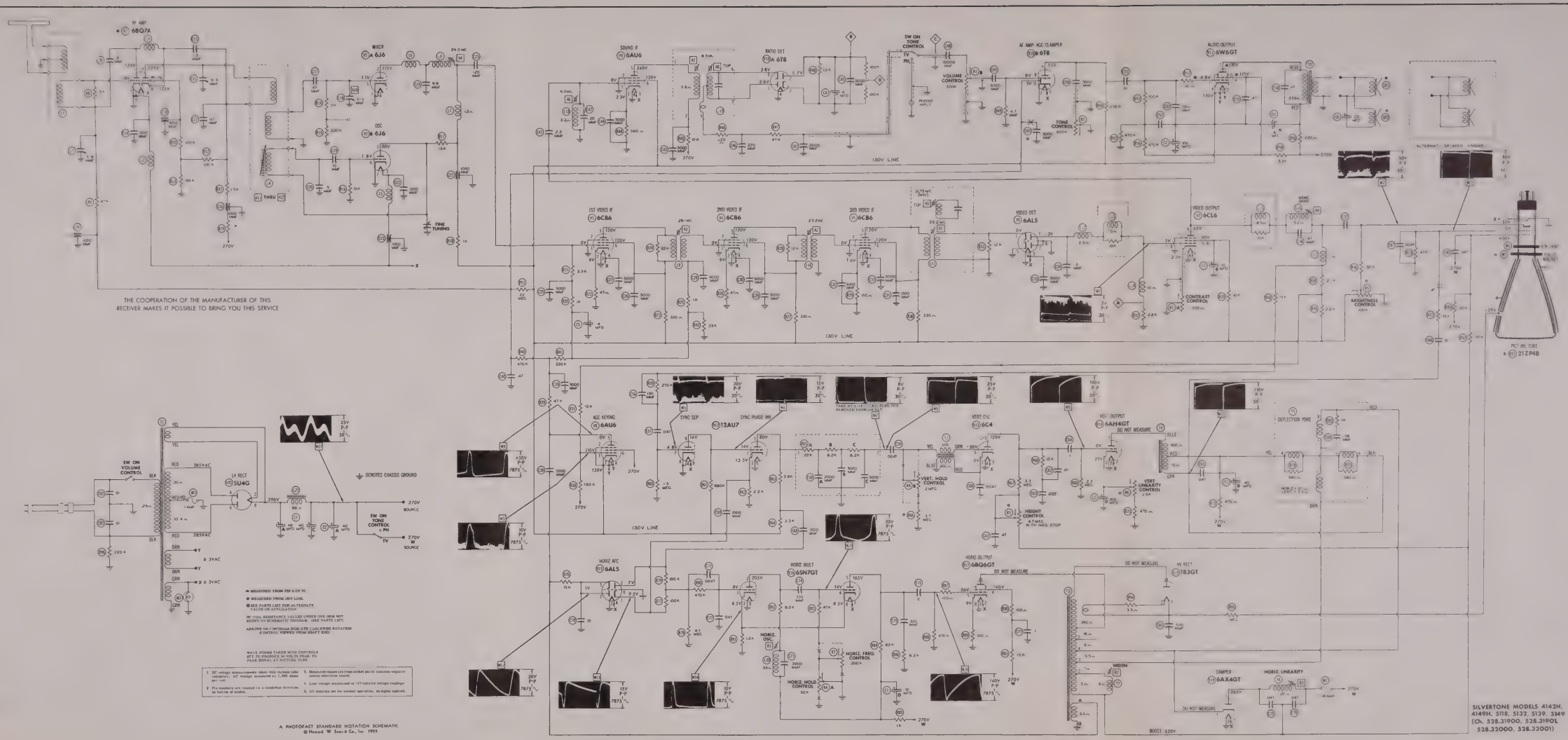
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
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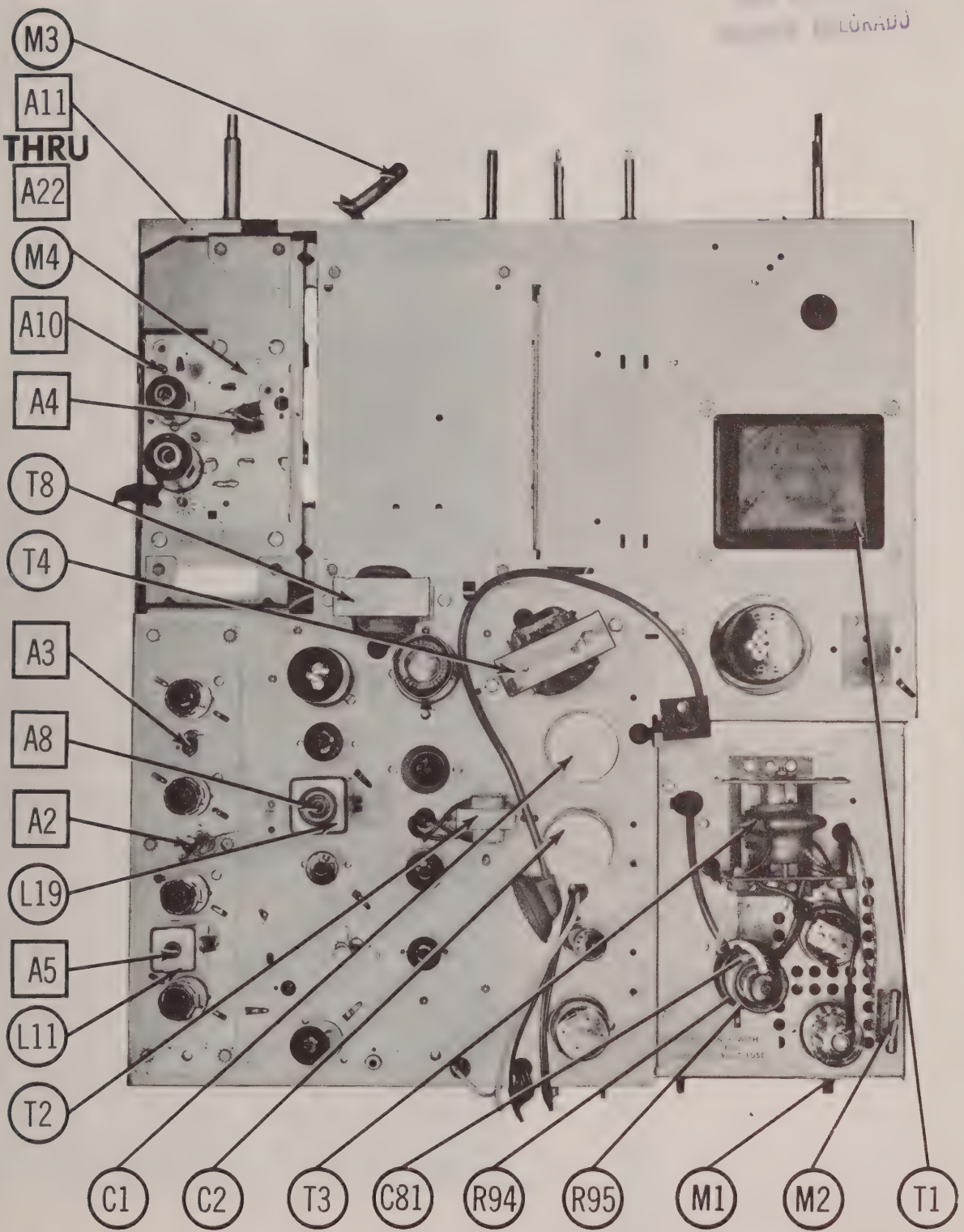
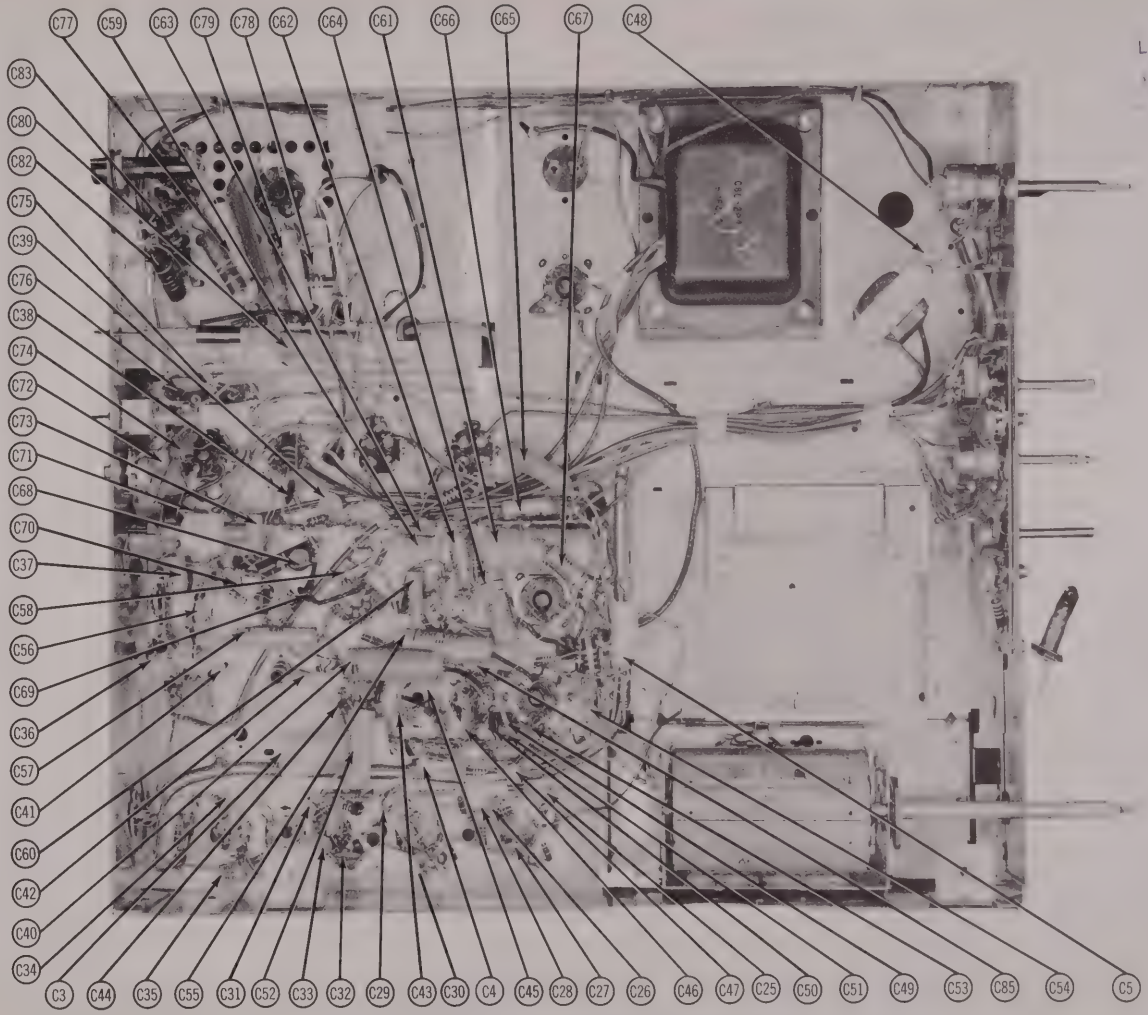


CHASSIS TOP VIEW

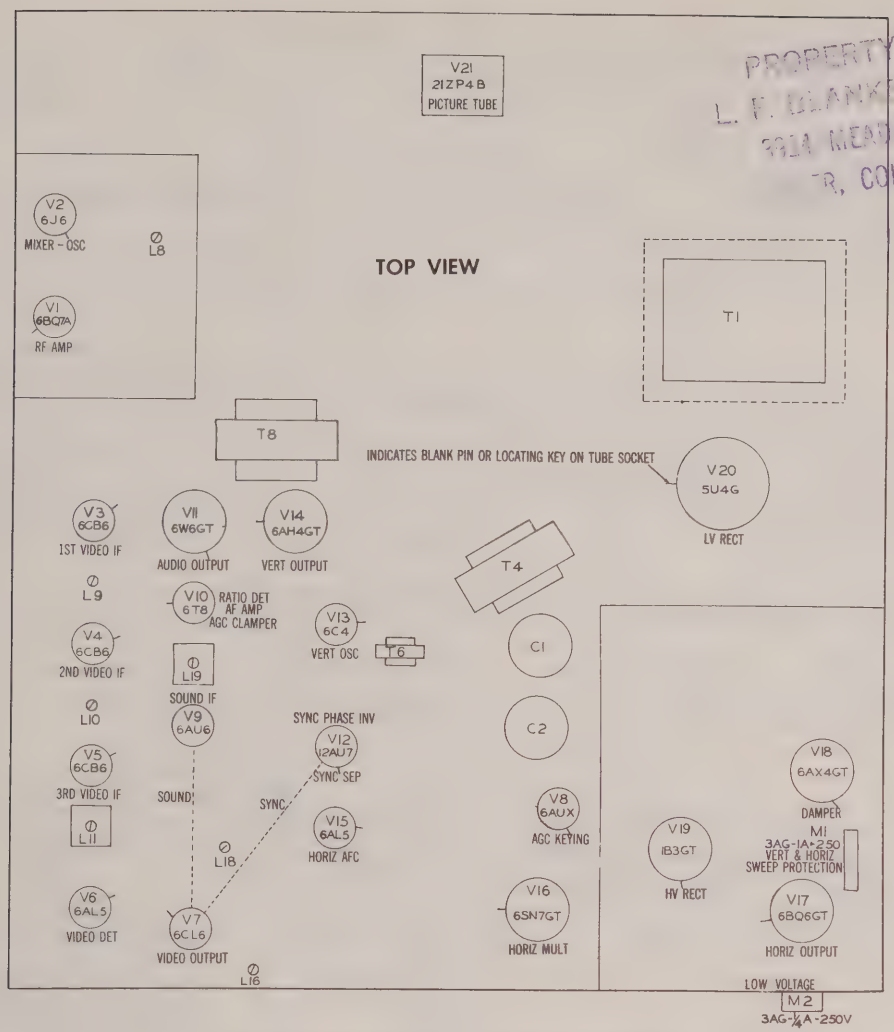
SET 267 FOLDER 13



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

L. F
DENVER, COLORADO

TUBE PLACEMENT CHART



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TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **V20, Fuse (M1)**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V6, V7, V11**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V7, V8, V21**
Has pic, no sound - **V9, V10, V11**
Overloaded picture - **V8, V10**

SYNC FAILURE
No vert. sync - **V12, V13**
No horiz. sync - **V12, V15, V16**
No vert. or horiz. sync - **V12**

SWEEP FAILURE
No raster, has sound - **V16, V17, V18, V19, V21, Fuse (M2)**
No vertical deflection - **V13, V14**
Poor vert. linearity or foldover - **V13, V14**
Poor horiz. linearity or foldover - **V16, V17, V18**
Narrow picture - **V16, V17, V18, V19, V20**
Vert. off freq. - **V12, V13**
Horiz. off freq. - **V12, V15, V16**

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Disconnect one side of fuse M2 to disable the high voltage.

VIDEO IF ALIGNMENT

Connect the negative side of a 4. 5 Volt bias supply to the ungrounded side of C5. Connect the positive lead to chassis. Short antenna leads to chassis.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1	Direct	High side to an ungrounded tube shield floating over converter tube V2. Low side to chassis.	25. 2MC	Any non-interfering channel.	DC probe to point Ⓐ. Common to chassis.	A1	Adjust for maximum deflection. Attenuate generator output to maintain not more than 2. 5 volts on VTVM.
2	"	"	23. 2MC	"	"	A2	"
3	"	"	26. 1MC	"	"	A3	"
4	"	"	24. 0MC	"	"	A4	"
5	"	"	21. 75MC	"	"	A5	Adjust for minimum deflection. Increase generator output to provide usable indication on VTVM.

OVERALL VIDEO IF RESPONSE CHECK

Attenuate generator output to maintain 2 volt peak to peak on scope.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	Direct	High side to ungrounded tube shield floating over converter tube (V2). Low side to tuner chassis.	24MC (10MC Swp)	21. 75MC 25. 2MC 23. 2MC 26. 1MC 24. 0MC	Any non-interfering channel	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.		Check for response curve similar to Fig. 1. If necessary retouch A1 thru A4 to obtain desired response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (±1%) resistors in series from point Ⓑ to B-. The junction of these two resistors is alignment point Ⓓ as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7	. 01MFD	High side to point Ⓐ. Low side to chassis.	4. 5MC (Unmod.)	Any non-interfering channel.	DC probe to point Ⓒ. Common to chassis.	A6, A7	Adjust for maximum deflection.
8	"	"	"	"	DC probe to point Ⓒ. Common to point D.	A8	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	. 01MFD	High side to point Ⓐ. Low side to chassis.	4. 5MC (450KC Swp)	4. 5MC	Any non-interfering channel	Vert. Amp. to point Ⓑ. Low side to chassis.	A6, A7	Disconnect stabilizing capacitor C4. Adjust for curve of maximum amplitude and symmetry similar to Fig. 2.
8.	"	"	"	"	"	Vert. Amp. to point Ⓒ. Low side to chassis.	A8	Reconnect stabilizing capacitor C4. Adjust so that 4. 5MC occurs at center of cross-over lines as in Fig. 3. SLIGHTLY retouch A7 for maximum amplitude and straightness of crossover lines.

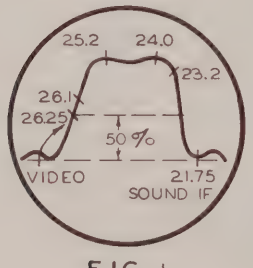


FIG. 1

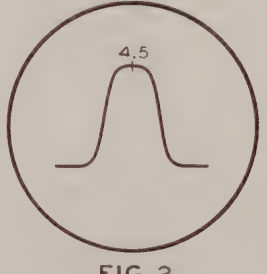


FIG. 2

ALIGNMENT INSTRUCTIONS (cont)

PROPL
L. F. BLA
3231 MEADE ST.
DENVER, COLORADO

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
9	.01MFD	High side to pin 11 (cathode) of picture tube.	4.5MC (Unmod.)	Any non-interfering channel.	DC probe to point (B). Common to chassis.	A9	Adjust for MINIMUM deflection.

ALTERNATE 4.5MC TRAP ALIGNMENT

Turn the set on and tune in a TV station.
Adjust A9 for minimum 4.5MC beat interference in picture.

OSCILLATOR ALIGNMENT

Complete oscillator alignment may not be necessary. If the oscillator seems to be off frequency approximately the same amount for a majority of the channels, it may be possible to correct them in one step using A10. It should be noted that this is an all channel oscillator circuit adjustment and should not be used to correct any individual channel.
If adjustment of A10 will not bring all channels well within range of the fine tuning control, it will be necessary to adjust the channel strip adjustment for each channel that is off frequency. The channel oscillator adjustment screws are reached thru a hole to the right of the channel switch shaft. The correct adjustment screw is accessible thru this hole as the channel switch is turned to each channel.
Replace the converter tube shield to its normal position.
Connect the bias battery as under "Video IF Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	Two 120Ω Carbon Resistors	Across VHF antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A11	Adjust to place sound marker in trap "notch" as in Fig. 4. Video marker should be at 50%.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A12	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A13	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A14	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A15	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A16	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A17	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A18	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A19	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A20	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A21	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A22	

RF AND MIXER ALIGNMENT

The RF and mixer portions of this receiver have been properly aligned at the factory and are very stable. Alignment of these portions should not be required in the field.

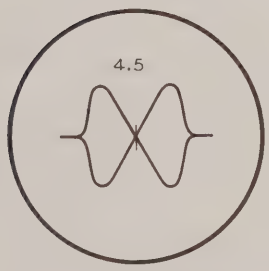


FIG. 3

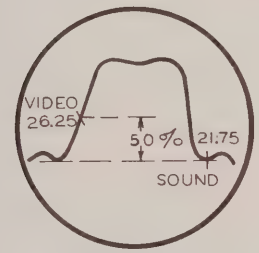
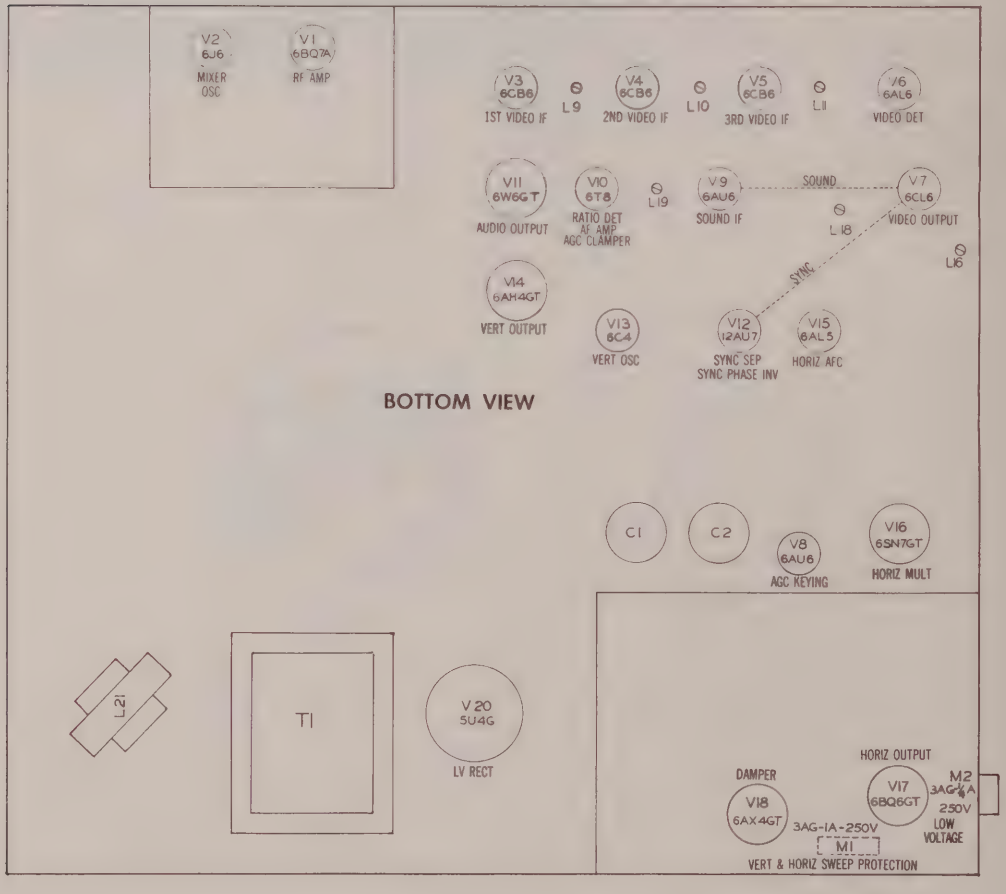


FIG. 4

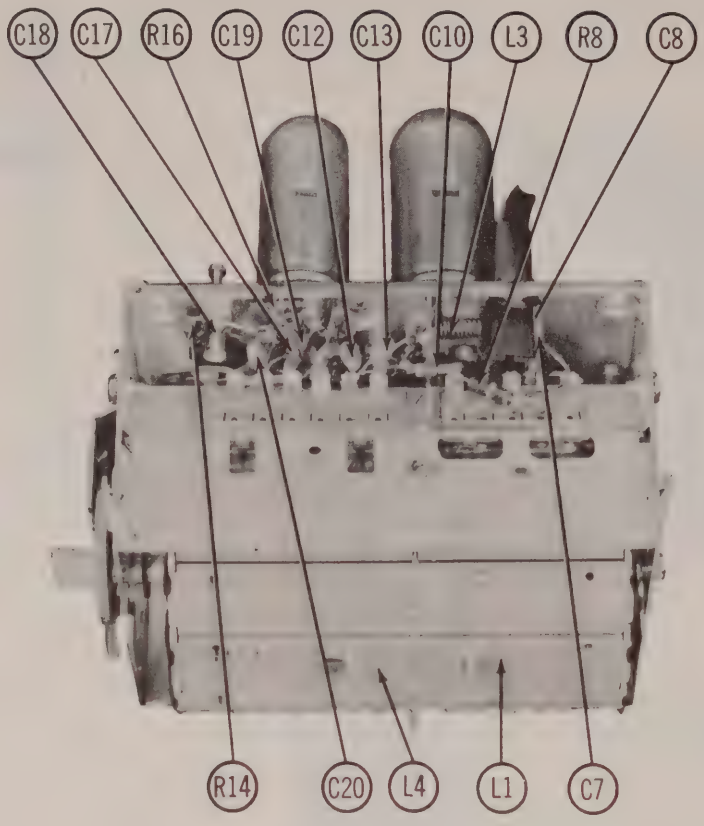
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7A	INF	700KΩ	0Ω	.1Ω	0Ω	†1.6KΩ	†180KΩ	INF	0Ω
V 2	6J6	■16KΩ	†1KΩ	.1Ω	0Ω	230KΩ	10KΩ	0Ω		
V 3	6CB6	37KΩ	47Ω	0Ω	.1Ω	■330Ω	■330Ω	0Ω		
V 4	6CB6	34KΩ	47Ω	0Ω	.1Ω	■330Ω	■330Ω	0Ω		
V 5	6CB6	.2Ω	150Ω	0Ω	.1Ω	■330Ω	■330Ω	0Ω		
V 6	6AL5	.5Ω	0Ω	.1Ω	0Ω	0Ω	0Ω	3.3KΩ		
V 7	6CL6	110Ω	3.3KΩ	■10KΩ	0Ω	.1Ω	■5KΩ	0Ω	■10KΩ	3.3KΩ
V 8	6AU6	■12.2KΩ	■0Ω	■0Ω	■0Ω	300KΩ	†90Ω	■0Ω		
V 9	6AU6	3.2Ω	0Ω	.1Ω	0Ω	†10KΩ	■0Ω	560Ω		
V 10	6T8	INF	12KΩ	INF	0Ω	.1Ω	600KΩ	0Ω	4.7Meg	■270KΩ
V 11	6W6GT	INF	60KΩ	†650Ω	†3.4KΩ	370KΩ	250KΩ	60KΩ	60KΩ	
V 12	12AU7	■8.2KΩ	■680KΩ	2.2KΩ	0Ω	0Ω	■680KΩ	1.5Meg	0Ω	.1Ω
V 13	6C4	▲6Meg	INF	.1Ω	0Ω	▲6Meg	2.2Meg	200Ω		
V 14	6AH4GT	2.2Meg	0Ω	INF	INF	†1.2KΩ	INF	.1Ω	1.1KΩ	
V 15	6AL5	4.8Meg	4.8Meg	0Ω	.1Ω	15KΩ	0Ω	15KΩ		
V 16	6SN7GT	5.2Meg	†9.3KΩ	1.5KΩ	130KΩ	†85KΩ	1.5KΩ	.1Ω	0Ω	
V 17	6BQ6GT	INF	.1Ω	470KΩ	†15KΩ	470KΩ	†15KΩ	0Ω	100Ω	TOP CAP ▲17Ω
V 18	6AX4GT	INF	INF	300KΩ	INF	†115Ω	†85Ω	.1Ω	0Ω	
V 19	1B3GT		PINS	1 - 8	HAVE	INF	RESISTANCE			TOP CAP ▲377Ω
V 20	5U4G	INF	50KΩ	INF	33Ω	INF	35Ω	INF	50KΩ	
V 21	21ZP4B	0Ω	47KΩ	PIN 10 ▲100KΩ	PIN 11 ■220KΩ	PIN 12 .1Ω				

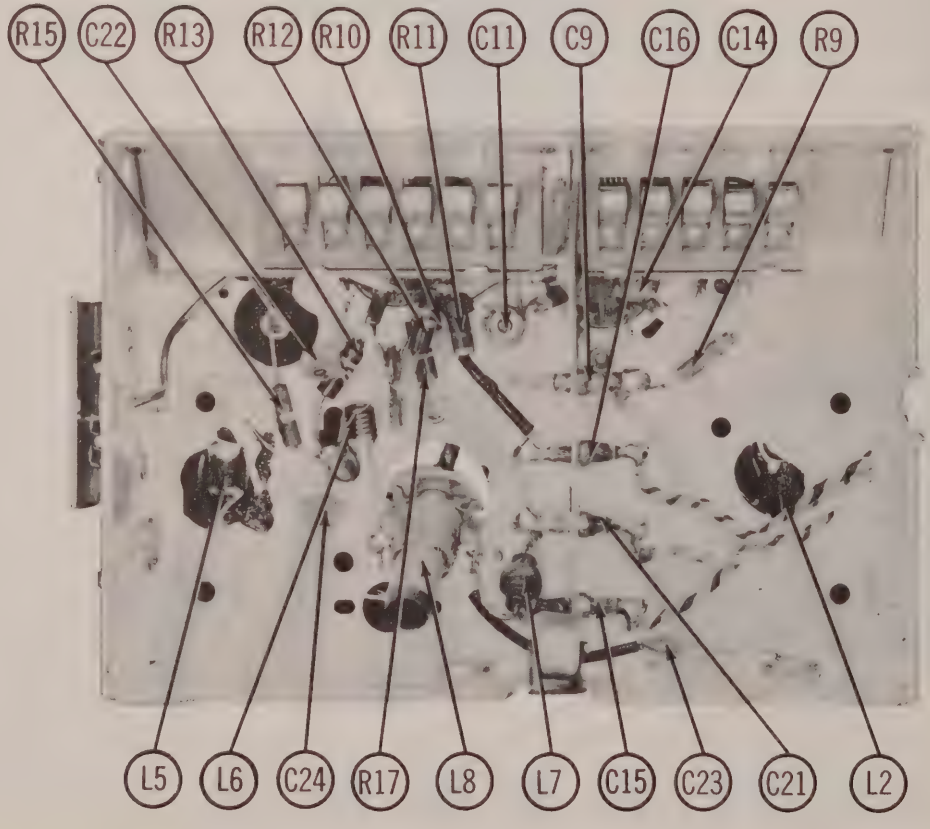
† MEASURED FROM PIN 8 OF V20
■ MEASURED FROM 130V LINE
▲ MEASURED FROM PIN 3 OF V18



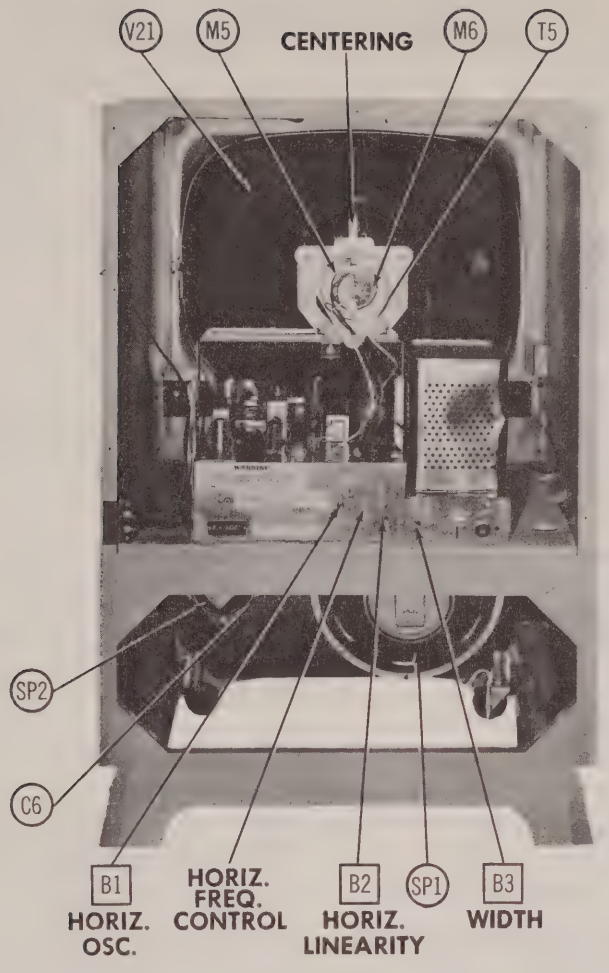
TUBE PLACEMENT CHART



RF TUNER-RIGHT SIDE



RF TUNER-BOTTOM VIEW



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3924 MEADE
DENVER, COLORADO

CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn set on and tune in a TV station, preferably a test pattern.

Remove V15 from set and short across B1 with clip lead.

Set the horizontal hold control to its mid-range and adjust R7 (Horiz. Freq. Control) for least picture movement.

Remove short from B1 and adjust B1 until picture synchronizes horizontally.

Replace V15 and adjust horiz. hold control until picture synchronizes horizontally. If picture does not fall in sync, SLIGHTLY retouch B1 (Horiz. Osc. Slug). Repeat procedure until picture falls in sync after momentary removal of signal.

Adjust the width coil slug B2 for a picture slightly wider than necessary to fill the picture mask horizontally.

Adjust the horizontal linearity slug B3 until picture is symmetrical from left to right.

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage."

INSUFFICIENT SWEEP

Check by substitution V17, V18 and V20. Check adjustments B2 and B3. Check R86, R89, R91, C75, C76, T3, T5A and other associated components.

DRIVE LINES

Check by substitution V17 and V18. Check adjustment B3. Check C76, R89, R91, T3, T5A and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V17 and V18. Check horizontal output and damper stages for component failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V16, V17 and V18. Check C72 for open. Check L20, C73, C71, R81 and other associated components.

XMAS TREE EFFECT

Check by substitution V16, V17 and V18. Check T3 and T5A for internal arcing. Check L20, C73, C74, C76, R82, R84, R81 and other associated components.

VERTICAL

LOSS OF SWEEP

Check by substitution V13 and V14. Check waveform W9.

If Satisfactory	If Unsatisfactory
Check T4, T5B, R71, R70, R6, C2D, C1B and other associated components.	Check C64, C61, R67, R3, T2 and other associated components.

INSUFFICIENT SWEEP

Check by substitution V13 and V14. Check height and vertical linearity controls for proper operation. Check T4, T5B, R67 and other associated components.

COMPRESSED AT BOTTOM

Check by substitution V13 and V14. Check R3, R67, C61, C64, C60 and other associated components.

COMPRESSED AT TOP

Check by substitution V13 and V14. Check C2D, R6, R70, T4 and other associated components.

FOLDS

Check by substitution V13 and V14. Check C62, C63, C64, R68, R70 and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Substitute V12. Check R58, R59, R61, R64, R63, C56, C57 and other associated components.

LOSS OF VERTICAL SYNC - HORIZONTAL SYNC SATISFACTORY

Substitute V13. Check C59, C60, T2, R66 and R4B. Check vertical integrator network.

LOSS OF HORIZONTAL SYNC - VERTICAL SYNC SATISFACTORY

Check by substitution V15 and V16. Check L20, C73, C71, C72, C69, C68 and R83. Check horizontal AFC network.

HORIZONTAL BENDING

Check by substitution V8, V12, V15 and V16. Check horizontal AFC network.

VIDEO

LOSS OF VIDEO

Substitute V7. Check L15, L17, C37, R33, R34, R35 and other associated components.

SOUND BARS (4.5 MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check adjustment A9. Check video IF Alignment.

POOR CONTRAST

Substitute V7. Check contrast control. Check picture tube. Check L12, L13, L14, L15, C37 and other associated components.

NEGATIVE PICTURE

Substitute V7. Check picture tube. Check video detector network. Check L12, L13, C37 and other associated components.

SMEAR

Substitute V7. Check L12, L13, L14, L15, C37 and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V1, V3, V4, V5, V6, and V7 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V9, V10 and V11. Check stages V10 and V11 using audio signal generator. Apply audio across R1B.

If Satisfactory	If Unsatisfactory
Check ratio detector and audio IF stages for component failure or change of value	Check C48, C49, C51, C55, C3, C54, R55, R54, R56, T8, speaker and other associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustment A8. If still unsatisfactory, check audio IF alignment.

DISTORTED

Follow procedure outlined under "Weak or No Sound".

POWER

DEAD SET

If filaments fail to light, check AC interlock assembly. Check switch on volume control and T1. If filaments light, check M1 fuse. Substitute V20. Check B+ filter and decoupling network.

SMALL AND / OR DIM PICTURE

Substitute V20. Check B+ filter and decoupling network.

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: SILVERTONE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE
V1	RF Amp.	6BQ7A *	• 6BQ7A	9AJ
V2	Mixer - Osc.	6J6	6J6	7BF
V3	1st Video IF Amp.	6CB6	6CB6	7CM
V4	2nd Video IF Amp.	6CB6	6CB6	7CM
V5	3rd Video IF Amp.	6CB6	6CB6	7CM
V6	Video Det	6AL5	6AL5	6BT
V7	Video Output	6CL6	6CL6	9BV
V8	AGC Keying	6AU6	6AU6	7BK
V9	Sound IF Amp.	6AU6	6AU6	7BK
V10	Ratio Det-AF Amp-AGC Clamper	6T8	6T8	9E
V11	Audio Output	6W6GT	6W6GT	7S
V12	Sync Sep-Sync Phase Inv.	12AU7	12AU7	9A
V13	Vert. Osc.	6C4	6C4	6BG
V14	Vert. Output	6AH4GT	6AH4GT	8EL
V15	Horiz. AFC	6AL5	6AL5	6BT
V16	Horiz. Mult.	6SN7GT	6SN7GT	8BD
V17	Horiz. Output	6BQ6GT	6BQ6GT	6AM
V18	Damper	6AX4GT	6AX4GT	4CG
V19	HV Rect.	1B3GT	1B3GT	3C
V20	LV Rect.	5U4G	5U4G	5T

* 6BQ7 or 6BZ7 used as alternates.

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: SILVERTONE PART No.	CBS-HYTRON PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V21	21ZP4B ① 21ZP4	21ZP4B ① 21ZP4A	21ZP4B ① 21ZP4A	21ZP4B ① 21ZP4A 21ZP4	21ZP4B ① 21ZP4A	12N 12N 12D	① Aluminized

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: SILVERTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	▰40	350	T18-310	AFH3-44		C035		FP377	TVL-3787	
B	■40	350		PRS350/10		BR1235		TC62	TVA-1604	
C	▲40	350								
D	10	350								
C2A	▰40	350	T18-311	AFH3-140		C105		FP423.4	TVL-3762	
B	■10	350		PRS50/100		BRH501			TVA-1310	
C	▲100	200								
D	100	50								
C3	16	200	①	PRS250/16		BR1625		TC54	TVA-1507	
C4	4	50	T18-292	PRS150/4		BR415		TC30	TVA-1303	
C5	4	50	T18-292	PRS150/4		BR415		TC30	TVA-1303	
C6	25	25		PRS25/25		BR252		TC26	TVA-1205	
C7	3-8									
C8	3			SI3NP0	TCZ-3		NP0K-030	ZT-553		
C9	1000			EF-001	MFT-1000				503C-D1	
C10	1000			EF-001	MFT-1000				503C-D1	
C11	.5-3				829-3		3115-01-0R5	CT565A		
C12	47									
C13	1.5									
C14	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C15	1000			EF-001	MFT-1000				503C-D1	
C16	1000			EF-001	MFT-1000				503C-D1	
C17	47									
C18	.5-3				829-3		3115-01-0R5	CT565A		
C19	10			SI10NP0	TCZ-10	TZ09	NP0K-100	ZT-541	5TCC-Q1	
C20	5									
C21	1000			EF-001	MFT-1000				503C-D1	
C22	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C23	120			BPD-00012	DD-121	G044	GP1K-121	UC-5312	5GA-T12	
C24	6.8			SI6.8NP0	TCZ-6.8	TZ08	NP0K-6R8	ZT-5568	5TCCB-V68	
C25	5000		T16-177	BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C26	5000		T16-177	BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C27	5000		T16-177	BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C28	5000		T16-177	BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C29	5000		T16-177	BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C30	5000		T16-177	BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C31	1500		T16-241	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C32	5000		T16-177	BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C33	5000		T16-177	BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C34	5		T15-222							
C35	5000		T16-177	BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C36	47		T16-249	SI47	D6-470	TP29	GP1K-470	UC-5447	5GA-Q47	
C37	.1	400	T16-244	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C38	1000		T15-220	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C39	5000		T16-177	BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C40	.47	200	T16-240	P288-47		PJ2P47		PT4047	2TM-P47	
C41	2.2			SI2.2NP0	TCZ-2.2					
C42	20			SI20NP0	TCZ-20					
C43	5000		T16-177	BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C44	5000		T16-177	BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C45	5000		T16-177	BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C46	220	500	T15-218	1468-221		22R5T22				
C47	2000		T15-228	BPD-002	DD-202	K072	801-002	DC-522	5HK-D2	
C48	10000		T15-211	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C49	5000		T16-177	BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C50	5000		T16-177	BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C51	.01	400	T16-247	P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C52	.1	400	T16-244	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C53	1000		T15-220	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C54	.01	600	T16-237	P688-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	
C55	.47	200	T16-240	P288-47		PJ2P47		PT4047	2TM-P47	
C56	150		T15-251	BPD-00015	DD-151	G046	GP2K-151	UC-5315	5GA-T15	
C57	.047	400	T16-245	P488-047	DF-503	CUB4S47		PT4147	4TM-S47	
C58A	2000			BPD-002						
B	5000		•T17-109	BPD-005	•PC-100	•115TM1	•1405-01		•V-1	
C	5000			BPD-005						
C59	.0047	600	T16-223	P688-0047	D6-472	CUB6D47	GP2-333-472	UC-5247	5GA-D47	
C60	.0047	600	T16-220	P688-0047	D6-472	CUB6D47	GP2-333-472	UC-5247	5GA-D47	
C61	.47	600	T16-249	P688-47		CUB6P47		PT6047	6TM-P47	
C62	.01	400	T16-247	P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C63	.022	400	T16-248	P488-022		CUB4S22		PT4122	4TM-S22	
C64	.1	400	T16-244	P488-1	DF-104	CUB4P1		PT401	4TM-P1	

SILVERTONE MODELS 4142H, 4149H, 5118, 5132, 5139, 5149 (Ch. 528.31900, 528.31901, 528.32000, 528.32001)

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA SILVERTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C65	.047	400	T16-245	P488-047	DF-503	CUB4S47		PT4147	4TM-S47	
C66	.01	400	T16-247	P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C67	.0047	600	T16-220	P688-0047	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C68	1000		T15-220	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C69	1000		T15-220	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C70	.01	600	T16-240	P688-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	
C71	.0047	600	T16-220	P688-0047	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C72	.047	600	T16-245	P688-047	DF-503	CUB6S47		PT6147	6TM-S47	
C73	3900	500								
C74	330	500	T15-226	1468-331		22R5T33				
C75	330	500	T15-226	1468-331		22R5T33				
C76	.01	400	T16-247	P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C77	.1	400	T16-244	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C78	.047	400	T16-245	P488-047	DF-503	CUB4S47		PT4147	4TM-S47	
C79	.047	400	T16-245	P488-047	DF-503	CUB4S47		PT4147	4TM-S47	
C80	.047	600	T16-235	P688-047		CUB6S47		PT6147	6TM-S47	
C81	500	20000	T15-239							
C82	.01	600	T16-601	689ZX-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	
C83	.01	600	T16-601	689ZX-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	
C84	56	3000								
C85	5000		T16-177 ①	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	

♦ Items C58A, C58B, C58C, R65A, R65B, R65C are combined in one unit.
① Some versions use 60MFD in this application (part no. T18-309).
② Not used in some versions.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA SILVERTONE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	300Ω	½	24-213	♦QJ-549	RTV-477	F1-0		Contrast-Panel
B	500KΩ	½				R2-41		Volume-Rear
C	Switch					KB-1		Attach to R1B
R2	500KΩ	½	A24-207					Tone & Phono Switch
R3A	4.7Meg with 1Meg stop	½	A25-25	Q11-141	A47-5Meg-S	AB-86	U-67	Height - Note 1
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1	Not Req.	Attach to R3A
R3A	5Meg with 1Meg stop	½	A25-43	Q11-141	A47-4Meg-S	AB-86	SU-67	Height - Note 1 & 2
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1	Not Req.	Attach to R3A
R4A	50KΩ	½	A25-29	*QJ-525	RTV-458	F1-29	UF45L †	Horiz. Hold (Panel)
B	2Meg	½				R2-67	UR26L †	Vert. Hold (Rear)
R5A	100KΩ	½	A25-26	Q11-128	A47-100K-S	AB-40	U-41	Brightness - Note 3
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R5A
R6A	2500Ω	½	A25-13	Q11-112	A47-2500-S	AB-7	SU-8	Vert. Linearity
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1	Not Req.	Attach to R6A
R6A	2500Ω	½	A25-45	Q11-112	A47-2500-S	AB-7	SU-8	Vert. Linearity - Note 2
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1	Not Req.	Attach to R6A
R7A	200KΩ	½	A25-48	Q11-129	A47-200K-S	BX-46	U-43	Horiz. Frequency
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Not Req.	Attach to R7A

♦ CONCENTRIKIT EQUIVALENT: KIT K-2, BASE ELEMENTS & SHAFTS: B11-102 & P1-200 (PANEL)
B13-133 & R1-223 (REAR)
76-1 SWITCH

* CONCENTRIKIT EQUIVALENT: KIT K-2, BASE ELEMENTS & SHAFTS: B11-123 & P9-124 (PANEL)
B11-139 & R11-200 (REAR)

† Universal Replacement (Mallory Exact Duplicate Part No. UE1037)
Note 1: Connect a 1Meg resistor in series with the right hand terminal of the control & the lead connecting to the same terminal of the original control. (Control viewed from shaft end, terminals down.)
Note 2: Used in chassis 528. 31901 & 528. 32001 only.
Note 3: Chassis 528. 31901 & 528. 32001 may use an alternate control part no. T25-47.

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA SILVERTONE PART No.	IRC PART No.	NOTES
R8	15KΩ	½		BTS-15K	
R9	47KΩ	½		BTS-47K	
R10	100KΩ	½		BTS-100K	
R11	1500Ω	½		BTS-1500	
R12	100KΩ	½		BTS-100K	
R13	160KΩ	½		BTS-150K	
R14	10KΩ	½		BTS-10K	
R15	220KΩ	½		BTS-220K	
R16	10KΩ	½		BTS-10K	
R17	15KΩ	½		BTS-15K	
R18	1000Ω	½	T60-1020K	BTS-1000	
R19	1000Ω	½	T60-1020K	BTS-1000	
R20	1000Ω	½	T60-1020K	BTS-1000	
R21	3300Ω	½	T60-3320K	BTS-3300	
R22	47Ω	½	T60-4700K	BTS-47	
R23	330Ω	½	T60-3310K	BTS-330	
R24	22KΩ	½	T60-2230K	BTS-22K	
R25	1000Ω	½	T60-1020K	BTS-1000	
R26	47Ω	½	T60-4700K	BTS-47	
R27	330Ω	½	T60-3310K	BTS-330	
R28	12KΩ	½	T60-1230K	BTS-12K	
R29	150Ω	½	T60-1510K	BTS-150	
R30	330Ω	½	T60-3310K	BTS-330	
R31	12KΩ	½	T60-1230K	BTS-12K	
R32	3300Ω	½	T60-3320K	BTS-3300	
R33	10KΩ	½	T60-1030K	BTS-10K	
R34	2700Ω	2	T60-2722K	BTB-2700	
R35	2200Ω	2	T60-2222K	BTB-2700	
R36	150KΩ	½	T60-1540K	BTS-150K	
R37	10KΩ	½	T60-1030K	BTS-10K	
R38	180KΩ	½	T60-1840J	BTS-180K	
R39	47KΩ	½	T60-4730K	BTS-47K	
R40	470KΩ	½	T60-4740K	BTS-470K	
R41	220KΩ	½	T60-2240K	BTS-220K	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA SILVERTONE PART No.	IRC PART No.	NOTES
R42	33KΩ	½	T60-3330K	BTS-33K	
R43	120KΩ	1	T60-1240K	BTA-120K	
R44	560Ω	½	T60-5610K	BTS-560	
R45	10KΩ	1	T60-1031K	BTA-10K	
R46	220Ω	½	T60-2210K	BTS-220	
R47	47KΩ	½	T60-4730K	BTS-47K	
R48	12KΩ	½	T60-1230K	BTS-12K	
R49	4.7Meg	½	T60-4750K	BTS-4.7Meg	
R50	270KΩ	½	T60-2740K	BTS-270K	
R51	2.2Meg	½	T60-2250K	BTS-2.2Meg	
R52	100Ω	½	T60-1010K	BTS-100	
R53	100KΩ	½	T60-1040K	BTS-100K	
R54	3300Ω	1	T60-3321K	BTA-3300	
R55	220Ω	2	T60-2212K		
R56	470KΩ	½	T60-4740K	BTS-470K	
R57	470KΩ	½	T60-4740K	BTS-470K	
R58	15KΩ	½	T60-1530K	BTS-15K	
R59	270KΩ	½	T60-2740K	BTS-270K	
R60	1.5Meg	½	T60-1550K	BTS-1.5Meg	
R61	680KΩ	½	T60-6840K	BTS-680K	
R62	2200Ω	½	T60-2220K	BTS-2200	
R63	3900Ω	½	T60-3920K	BTS-3900	
R64	3300Ω	½	T60-3320K	BTS-3300	
R65A	22KΩ	½	♦T17-109	BTS-22K	
B	8200Ω	½		BTS-8200	
C	8200Ω	½		BTS-8200	
R66	3.5Meg	½		BTS-3.5Meg	Note 1
R67	3.3Meg	½	T60-3350K	BTS-3.3Meg	
R68	10KΩ	½	T60-1030K	BTS-10K	
R69	2.2Meg	½	T60-2250K	BTS-2.2Meg	
R70	470Ω	1	T60-4711K	BTA-470	
R71	470Ω	1	T60-4711K	BTA-470	
R72	33KΩ	½	T60-3330K	BTS-33K	
R73	47KΩ	½	T60-4730K	BTS-47K	

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (cont)

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	SILVERTONE PART No.	IRC PART No.	
R74	560Ω	½		BTS-560	
R75	560Ω	½		BTS-560	
R76	15KΩ	2	T60-1532K	BTB-15K	
R77	100KΩ	½	T60-1040K	BTS-100K	
R78	4.7Meg	½	T60-4750K	BTS-4.7Meg	
R79	100KΩ	½	T60-1040K	BTS-100K	
R80	470KΩ	½	T60-4740K	BTS-470K	
R81	1500Ω	½	T60-1520K	BTS-1500	
R82	8200Ω	½	T60-8220K	BTS-8200	
R83	47KΩ	½	T60-4730K	BTS-47K	
R84	82KΩ	1	T60-8231K	BTA-82K	
R85	1000Ω	½	T60-1020K	BTS-1000	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	SILVERTONE PART No.	IRC PART No.	
R86	8200Ω	½	T60-8220K	BTS-8200	
R87	100Ω	½	T60-1010K	BTS-100	
R88	470KΩ	½	T60-4740K	BTS-470K	
R89	100Ω	2	T60-1012K		
R90	100Ω	½	T60-1010K	BTS-100	
R91	15KΩ	5	T60-804		
R92	100KΩ	½	T60-1040K	BTS-100K	
R93	1000Ω	½		BTS-1000	
R94	3.3Ω	1	T60-884		
R95	1Meg	1	T60-1051M	BTA-1Meg	
R96	220KΩ	½	T60-2240K	BTS-220K	

Note 1: Some versions may use a 1.5Meg resistor in this application.
♦ Items R65A, R65B, R65C, C58A, C58B and C58C are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	SILVERTONE PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @ 1.6A	564VCT .220ADC	5VAC @ 3A	80-294	P-8332 ①		R-61BC ②			
	SEC. 3	SEC. 4	SEC. 5							
	6.3VAC @ 1.43A	6.3VAC @ 8.9A								

① Parallel and phase 6.3V @ 7.1A & .9A windings for sec. #4.
② Parallel and phase 6.3V @ 6A windings for sec. #4.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA							
		SILVERTONE PART No.	Halldorson PART No.	Merit PART No.	RCA PART No.	Ram PART No.	Stancor TYPE No.	Thordarson PART No.	Triad PART No.
T2	Vert. Osc. Trans.	T80-288	B6702 ①	A-3003 ①	209T1 ①	V405	A-8125①	24A87 ①	A-97X①
T3	Horiz. Output Trans.	T80-293	FB411 & RF800 *①	HV0-9 & MWC-1*①	232T1 & 212R1 * ①	X110 *		FLY-24 & WC-20*①	D-35 & WC-12*①
T4	Vert. Output Trans.	T80-290	Z1802①②	A-3038①②		V302①②	A-8142①②	26S72①②	A-108X① ②
T5A B	Yoke-Horiz. (14MH) Vert. (43MH)	T83-776③	DF602 ④	MDF-72⑤	211D2④	Y70F14 ⑥	DY-9A ⑦	Y-7 ⑤	Y-17-1⑤
T6	Horiz. Lin. Coil (1.5-8.5MH)	T10-582	RF800⑧⑨	MWC-6 ⑧	213R1	201R15	WC-8	WC-17⑩	WC-12 ①
T7	Width Coil (.05-.23MH)	T10-551			201R1	201R1A	WC-1	WC-11	

① Drill new mounting hole (s).
② Connect as auto transformer.
③ Includes capacitor C84, and resistors R74, R75, R93.
④ See instructions packed with unit pertaining to yoke damping network.
⑤ Connect horizontal yoke damping network across terminals #3 and #7. Use original network if necessary.
⑥ Use original yoke damping network.
⑦ Remove damping capacitor from terminals #1 and #2. Use original horizontal yoke damping network if necessary.
⑧ Enlarge mounting hole.
⑨ Connect to terminals #3 and #4.
⑩ Do not use tap.
⑪ Connect to coded blue and green terminals.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

	ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
	Horiz. Output Plate	9	9	10	13		9	10
	5(NC)	NC	NC	NC	NC		NC	NC
	4	See Note ⑫	See Note ⑫	See Note ⑬	6		See Note ⑫	See Note ⑭
	3	T or 4	T or 4	4	4		T or 4	4
	2	See width coil data	See width coil data	See width coil data	2		See width coil data	See width coil data
	1	1	1	3	1		1	3
	A	RF800 Term. #1	MWC-1 Blue Term.	2	9		WC-20 Term. #3	2
	G	RF800 Term. #2	MWC-1 Red Term.	1	8		WC-20 Term. #4	1
Connect Width Coil Across →	2 & 1	RF 800 Terms. #3 & #4 Across T & 3	MWC-1 Orange & black term. across T & 3	212R1 Across 2 & 1	2 & 1		WC-20 Term. #1 & #2 Across T & 3	WC-12 Red & blue terms. across 2 & 1
Special Notes →		⑫ ⑮ ⑯	⑫ ⑮ ⑯	⑬	⑰		⑫ ⑮ ⑯	⑭

⑫ Connect damper cathode to terminal #8, Yoke (red lead) to terminal #7.
⑬ Connect damper cathode to terminal #9, Yoke (red lead) to terminal #7.
⑭ Jumper terminals #9 and "T". Connect damper cathode to terminals #9 and "T", yoke (red lead) to terminal #7.
⑮ If the picture is out of phase, reverse width coil primary or secondary.
⑯ If insufficient width, add capacitance across terminal "T" and #3. Values required may range from .001MFD @ 600V to .005 MFD @ 600V.
⑰ Jumper terminals #10 and #11.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	SILVERTONE PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T8	2.1KΩ	3.7Ω	80-291	A-3849	A-2928 ①	S-4X ①	Z1110	22S45	① Drill one new mounting hole.

PROPERTY OF

PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	SILVERTONE PART No.	VIKING PART No.	QUAM PART No.	
SP1	12"	PM	3.7Ω	79-436	12J11	12A31	① Two 5" PM speakers used in Model 5118
SP2	4"	PM	3.6Ω	79-434	4J6	4A1	② Two 6" PM speakers used in Model 5132
	5"	PM	3.6Ω	79-440 ①	5J6	5A1	
	6"	PM	3.6Ω	79-439 ②	6J6	6A1	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	SILVERTONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coils	0Ω CT	0Ω					
L2	Fil. Choke	0Ω						
L3	Neutr. Coil							
L4	RF, Mixer Grid & Osc. Coils	0Ω						
L5	Fil. Choke	0Ω						
L6	RF Coil	0Ω						
L7	RF Coil	1.2Ω						
L8	1st. Video IF	.9Ω						
L9	2nd. Video IF	.2Ω	.2Ω	T10-541	17-1062		6250	
L10	3rd. Video IF	.2Ω	.2Ω	T10-542	17-1063		6249	
L11	4th. Video IF	.5Ω	.5Ω	T10-617				Includes 21.75MC trap
L12	Series Peaking Coil	2.5Ω		T33-237	19-6022		6152	20 Microhenries
L13	Series Peaking Coil	7.5Ω		T10-607	19-4120		6153 *	120 Microhenries, wound on 10KΩ resistor
L14	Shunt Peaking Coil	10Ω		T10-609	19-3250	TV-185	6154	220 Microhenries
L15	Series Peaking Coil	8.5Ω		T10-591	19-3160 *	TV-184 *	4644 *	150 Microhenries, wound on 10KΩ resistor
L16	4.5MC Trap	3.2Ω		T10-581	20-1004	TV-151	1469	
L17	Shunt Peaking Coil	11Ω		T10-590	19-3250	TV-185	6181	269 Microhenries
L18	Sound IF	3.2Ω		T10-587	20-1005	TV-151	1469	
L19	Ratio Det.	3.8Ω	.3ΩCT	T10-552	17-1033 ■	TV-110 ■	1468 ■	Tertiary winding -.8Ω
L20	Horiz. Osc.	53Ω		T10-583	19-1576	TV-163	6210	

* Parallel with 10KΩ resistor.

■ Drill mounting holes and disconnect capacitor acorss primary winding.

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	SILVERTONE PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
L21	.220ADC	88Ω	1.3HY	33-238	C-2327	C-2994	C-21X ①	C5040	26C41

① Drill one new mounting hole.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			SILVERTONE PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	1A 250V	T43-15	T87-44	312001 (3AG-1A)	341001	AGC 1	HKP
M2	3AG Pigtail	1/4A 250V	T43-13		318.250 (3AG-1/4A-P/T)		GJV-1/4	

MISCELLANEOUS

ITEM No.	PART NAME	SILVERTONE PART No.	NOTES
M3	Dial Light	T89-7	#47, Bayonet
M4	Tuner	T95-37	VHF
M5	Focus Magnet	T10-611 *	Includes centering device(* Alternate part #T10-652).
M6	Ion Trap	T83-684	
	Cabinet	T42-586	Model 4142H
	Cabinet	T42-581	Model 4149H
	Cabinet	T42-674	Model 5139
	Cabinet	T42-687	Model 5149
	Cabinet	T42-682	Model 5118
	Cabinet	T42-675	Model 5132
	Knob	T52-483	Channel Selector - All models
	Knob	T52-484	Fine tuning - All models
	Knob	T52-485	Contrast - All models
	Knob	T52-486	On-off-volume - all models
	Safety Glass	T48-92	Models 4142H, 4149H, 5139, 5149
	Safety Glass	T48-91	Models 5118, 5132
	Mask	T31-266	Models 4142H, 4149H, 5139, 5149
	Mask	T31-265	Models 5118, 5132

TROUBLE SHOOTING AIDS (cont)

DENVER, COLORADO

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V16, V17, V18 and V19. Check M2 fuse. Check waveform W16.

If Satisfactory	If Unsatisfactory
Check T3, T5A, T6, T7, C79, C78, C77, R91, R89 and other associated components.	Check C76, C74, C73, L20, R82, R84, R85 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V17, V18 and V20. Check C76, C75, R86, R89, R91, T3 and other associated components. Check adjustments B2 and B3.

BLOOMING

Check by substitution V17, V18, V19 and V20. Check R95, R91, C76 and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video."

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or No Sound."

RASTER, NO SOUND, NO PICTURE

Check by substitution V1, V2, V3, V4, V5, V6 and V7. Check video IF components for failure or change of valve.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set."

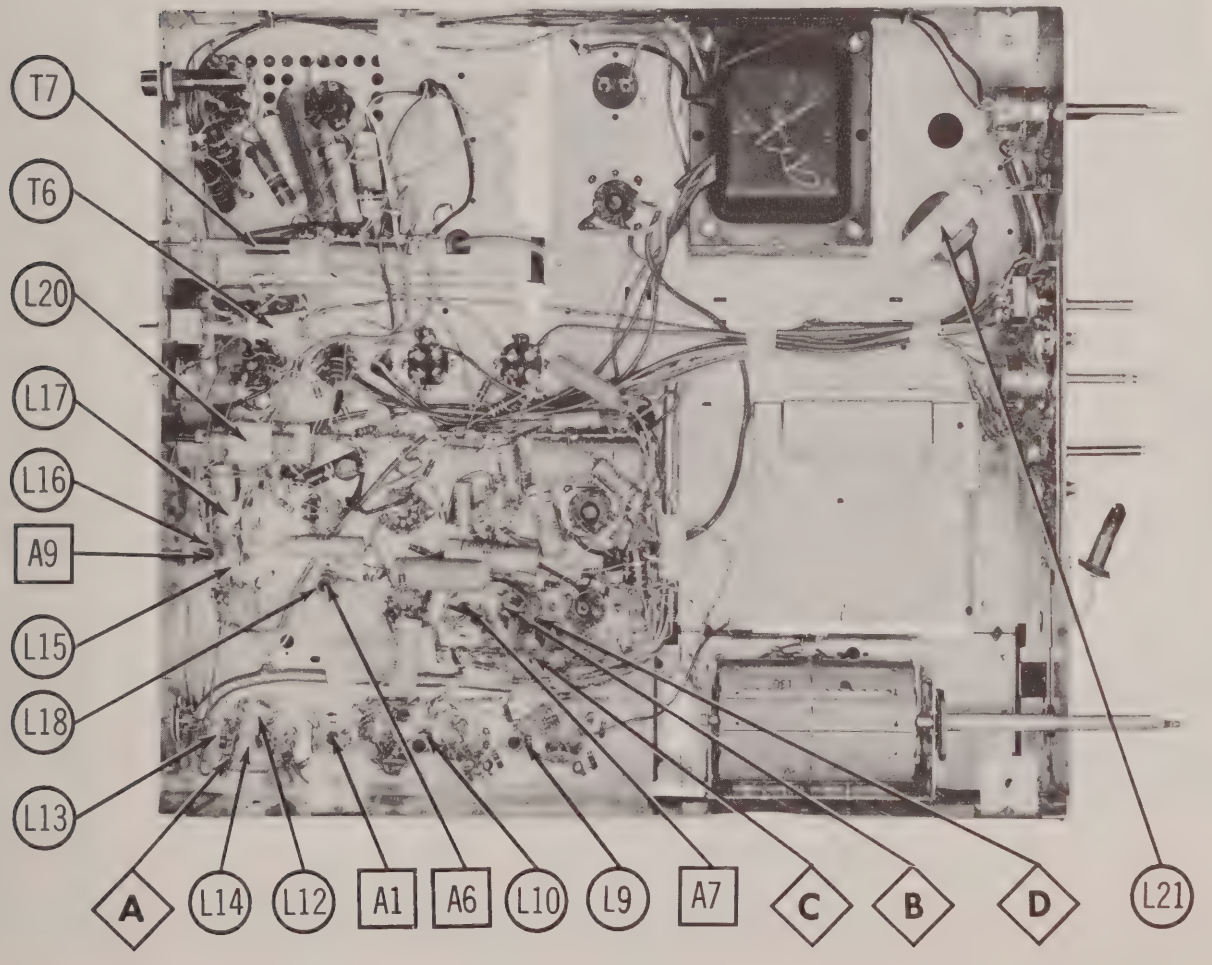
KEYSTONE EFFECT

Check T5 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.



SILVERTONE MODELS 4142H, 4149H, 5118, 5132, 5139, 5149 (Ch. 528.31900, 528.31901, 528.32000, 528.32001)

CHASSIS BOTTOM VIEW-TRANS., INDUCTOR & ALIGN. IDENTIFICATION

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF Tuner Oscillator Circuit may be accomplished by removal of the Channel Selector and Fine Tuning knobs. The adjustments are accessible, one at a time, through the small hole in the cabinet to the right of the Channel Selector shaft.

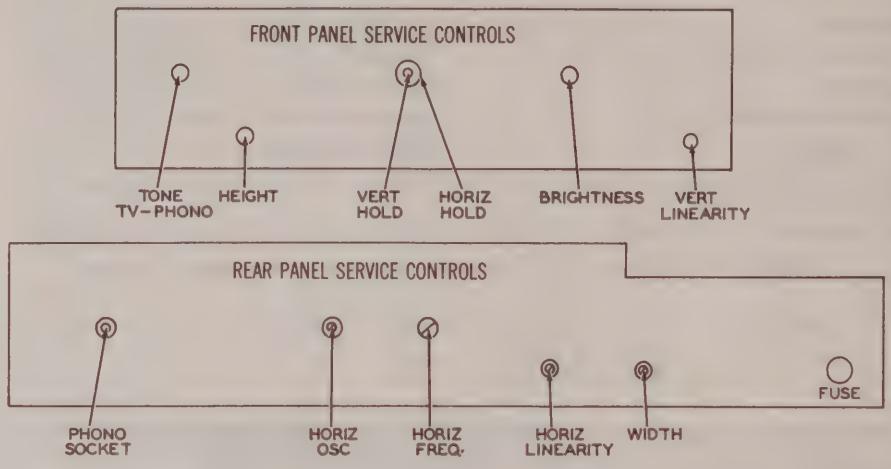
PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass, remove 5 wood screws holding metal strip at the top of safety glass. Remove metal strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions.)

SERVICE ADJUSTMENT LOCATION



HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the Horizontal Oscillator circuit may be made from the rear panel of the chassis.

Set the horizontal hold control in front of set at its mid-position and adjust Horizontal Oscillator slug (B1) until picture falls in and synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary located on top of chassis and directly back of detector tube (6T8).

FUSES

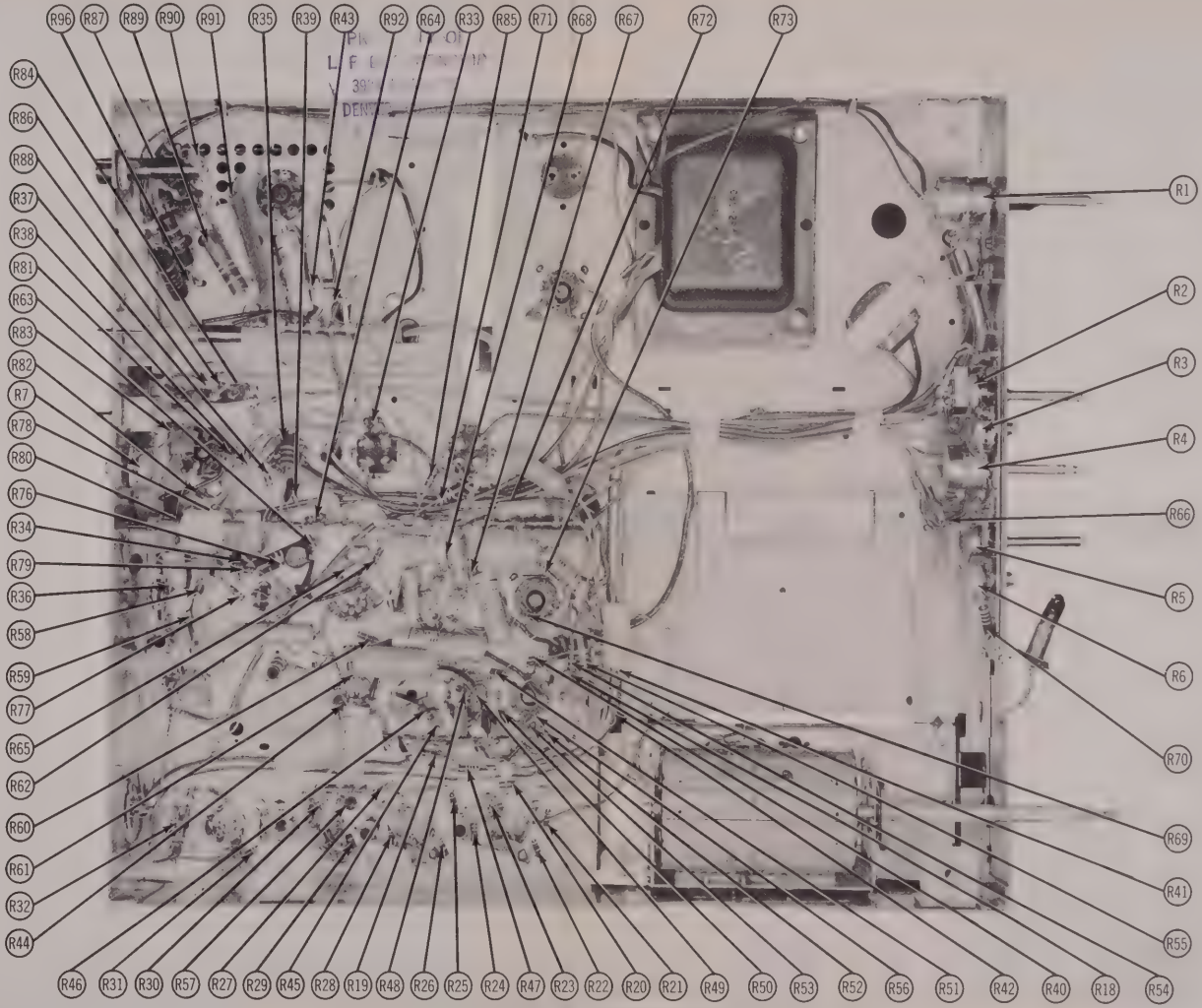
Two fuses are used. One for Horiz. Sweep Circuit protection and one for LV Power Supply protection. (For location, see tube placement chart.)

CENTERING

Centering is accomplished mechanically by means of a centering lever on the PM Focusing assembly. Adjust the centering lever from side to side, and up and down until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

1. Remove 4 push-on type control knobs from front panel.
2. Remove 8 metal screws. Remove rear cover.
3. Remove 2 wood screws from antenna bracket.
4. Remove speaker plug.
5. Remove 4 chassis bolts. Remove chassis.
6. Remove 4 speaker nuts from each speaker. Remove two speakers.



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

TRUETONE MODEL D3490

PROPERTY OF

TRUETONE MODEL D3490

TRUETONE MODEL D3490

TRADE NAME	Truetone Model D3490
SUPPLIER	Western Auto Supply Co., 2107 Grand Ave., Kansas City, Mo.
TYPE SET	Battery Operated Portable AM Superheterodyne Receiver
TUBES (Four)	Types 1R5 Conv., 1T4 IF Amp., 1S5 Det-AVC-AF Amp., 3V4 Output
POWER SUPPLY RATINGS	1.5 Volts "A" Supply & 67.5 Volts "B" Supply 260MA @ 1.5 Volts DC & 11 MA @ 67.5 Volts DC
TUNING RANGE—BROADCAST	520KC - 1640KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1MFD	High side to pin 6 (grid) of 1R5 (V1). Low side to chassis.	460KC (400~ Mod.)	Tuning gang fully open.	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2		Loop	1620KC	Tune to 1620KC signal.	"	A5	"
3		"	1400KC	Tune to 1400KC signal.	"	A6	"

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PARTS LIST AND DESCRIPTIONS

TRUETONE MODEL D3490

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: TRUETONE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	Converter	1R5	1R5	7AT	
V2	IF Amp.	1T4	1T4	6AR	
V3	Det-AVC-AF Amp.	1S5	1S5	6AU	
V4	Output	3V4	3V4	6BX	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: TRUETONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1	5	90	35Z100							
C2	.05	175	38Z104							
C3	100		38Z100	SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C4	10000		38Z102	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C5	10000		38Z102	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C6	100		38Z100	SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C7	2500		38Z103	SI2500	D6-252	TP58	GP2-333-252	UC-5225	5GA-T25	
C8	100		38Z100	SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C9	.05	175	38Z105							
C10	500		38Z101	SI500	D6-501	TP47	GP1K-501	UC-535	5GA-T5	
C11	5000		38Z106	BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TRUETONE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	2Meg	½	18Z100					Volume & Switch

RESISTORS

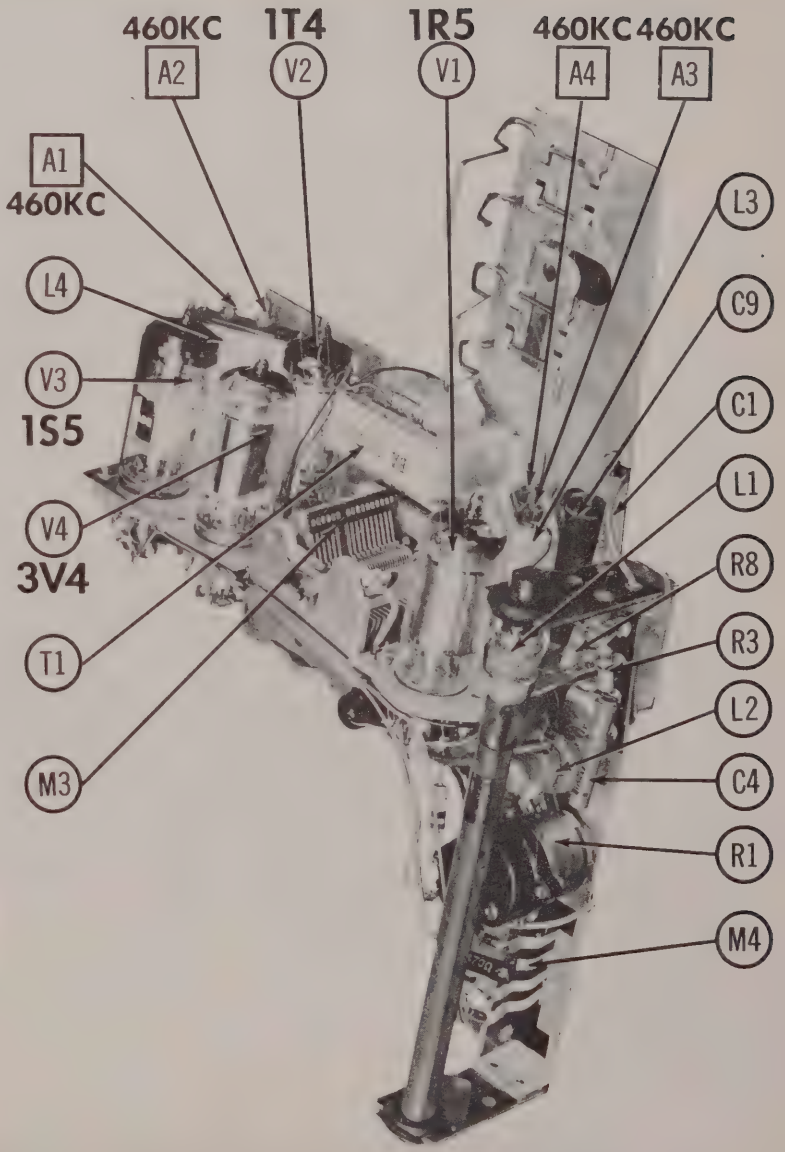
ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: TRUETONE PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R2	100KΩ	½	38Z109	BTS-100K	
R3	10KΩ	½	38Z115	BTS-10K	
R4	3Meg	½		BTS-3.3Meg	
R5	2000Ω	½	38Z107	BTS-1800	
R6	100KΩ	½	38Z109	BTS-100K	
R7	10Meg	½	38Z113	BTS-10Meg	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: TRUETONE PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R8	5.1Meg	½	38Z112	BTS-4.7Meg	
R9	1Meg	½	38Z110	BTS-1Meg	
R10	2Meg	½	38Z111	BTS-2Meg	
R11	370Ω	½	38Z116	BTS-390	
R12	300Ω	½	38Z114	BTS-330	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC.	REPLACEMENT DATA: TRUETONE PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T1	8KΩ	4, 8Ω	31Z100						

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	TRUETONE PART No.	JENSEN PART No.	QUAM PART No.	
SP1	2½"	PM	4. 8Ω	12Z100			

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	TRUETONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	1Ω		9Z100				
L2	Osc. Coil	1. 1Ω	2. 4Ω	9Z104				
L3	Input IF	13Ω	13Ω	9Z102				
L4	Output IF	12Ω	12Ω	9Z103				

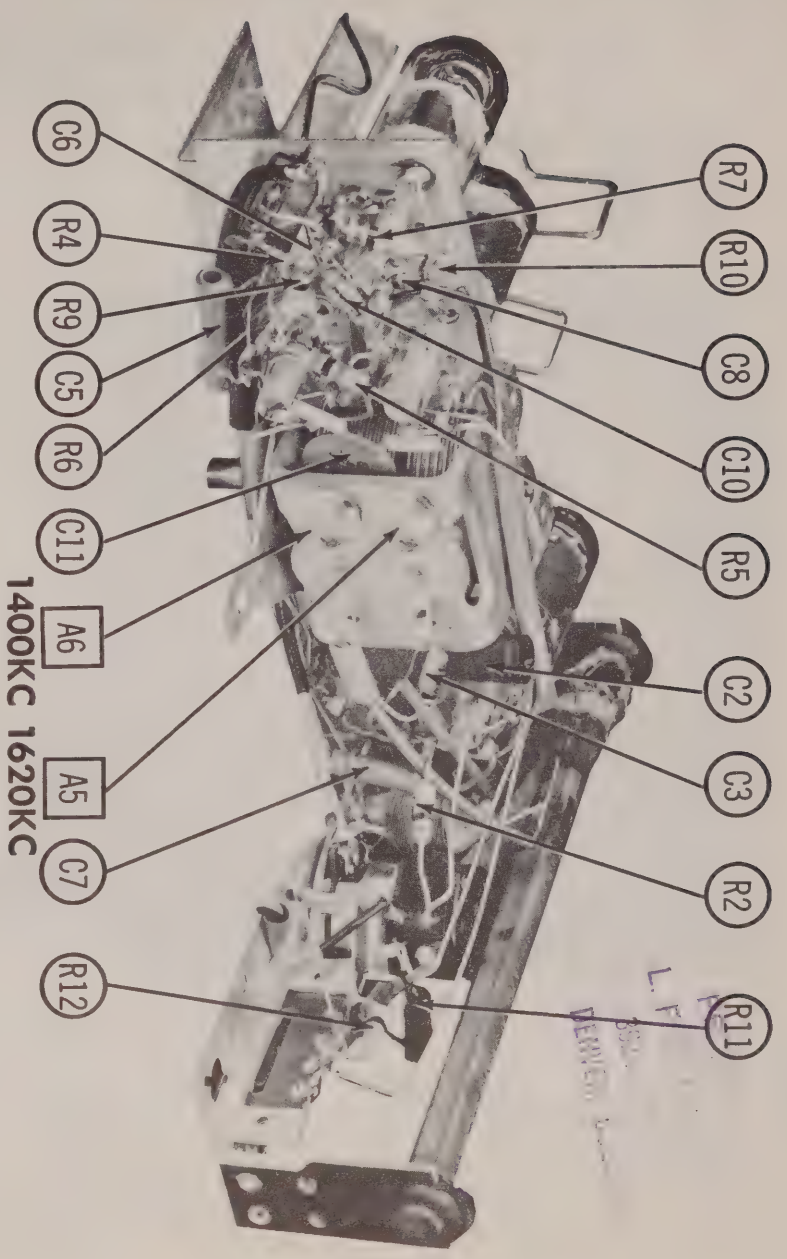
BATTERIES

ITEM No.	VOLTAGE	TRUETONE PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
M1	1. 5V		950			2R			Connect 2 in parallel.
M2	67. 5V			467			XX45		

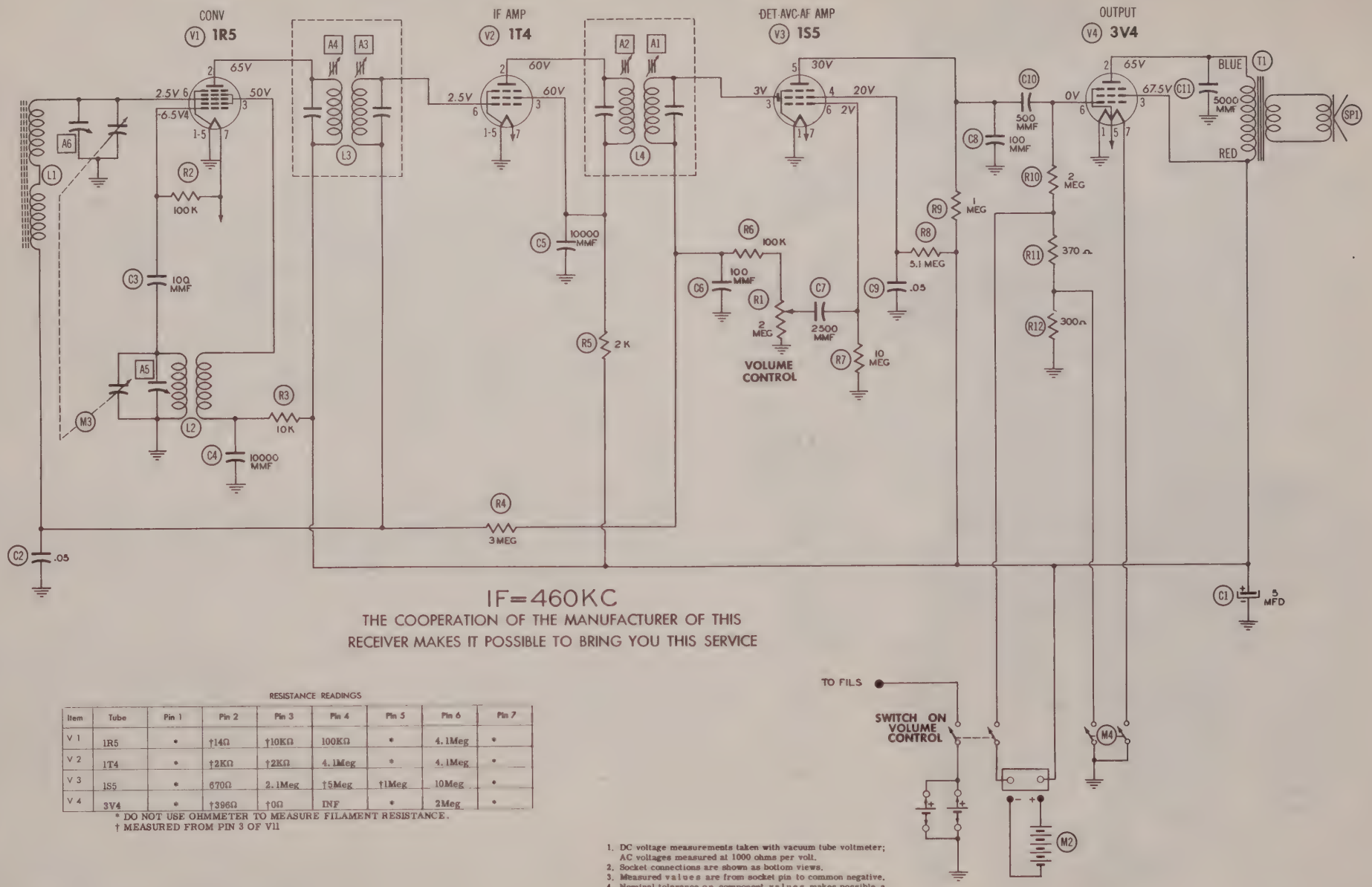
MISCELLANEOUS

ITEM No.	PART NAME	TRUETONE PART No.	NOTES
M3	Tuning Cap	14Z100	13-320MMF; 20-144MMF.
M4	Switch	1Z100	Battery Saver
	Cabinet	16Z100	Case (less back)
	Knob	10Z100	Tuning
	Knob	10Z101	Volume
	Knob	10Z102	Battery Saver Switch
	Handle	40Z100	
	Dial Scale	20Z100	

CHASSIS—BOTTOM VIEW



TRUETONE MODEL D3490



IF=460KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1R5	*	†14Ω	†10KΩ	100KΩ	*	4.1Meg	*
V 2	1T4	*	†2KΩ	†2KΩ	4.1Meg	*	4.1Meg	*
V 3	1S5	*	670Ω	2.1Meg	†5Meg	†1Meg	10Meg	*
V 4	3V4	*	†396Ω	†0Ω	INF	*	2Meg	*

* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.
† MEASURED FROM PIN 3 OF V11

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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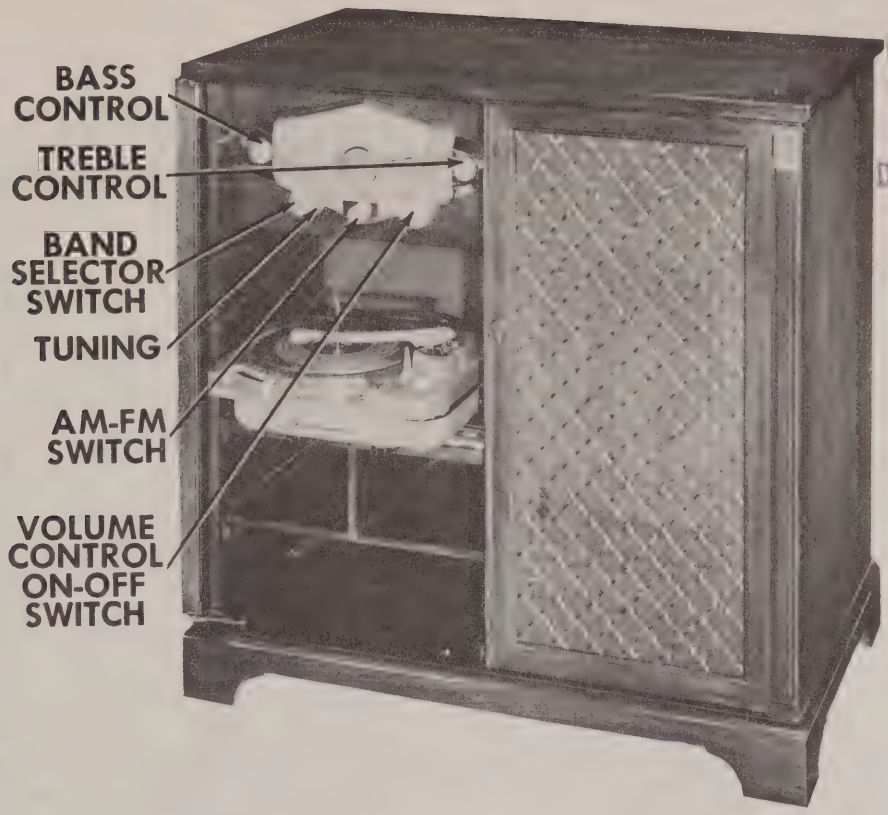
ZENITH MODELS
HFM1184E, HFM1190R (Ch. 11M20)



ZENITH MODELS
HFM1184E, HFM1190R (Ch. 11M20)

TRADE NAME	Zenith Models HFM1184E, HFM1190R (Ch. 11M20)
MANUFACTURER	Zenith Radio Corp., 6001 Dickens Ave., Chicago, Illinois
TYPE SET	AC Operated AM-FM-Phono Combination Superheterodyne Receiver With 3 Speed Automatic Record Changer
TUBES	Eleven
POWER SUPPLY	110-120 Volts AC-60 Cycles
RATING	.68 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1620KC
FREQ. MOD.	88-108MC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BJ6	■3.5Meg 2.2Meg	0Ω	.1Ω	0Ω	†5KΩ	†5KΩ	0Ω		
V 2	12AT7	†2.6KΩ	2.2Meg	0Ω	.1Ω	.1Ω	†5KΩ	10KΩ	0Ω	0Ω
V 3	6BA6	2.5Meg	0Ω	0Ω	.1Ω	†6.4KΩ	†6.4KΩ	0Ω		
V 4	6BA6	17Ω	0Ω	.1Ω	0Ω	†5.7KΩ	†5.7KΩ	100Ω		
V 5	6AU6	100KΩ	0Ω	.1Ω	0Ω	†27KΩ	†27KΩ	0Ω		
V 6	6T8	150KΩ	150KΩ	300KΩ	0Ω	.1Ω	300KΩ	0Ω	15Meg	†220KΩ
V 7	6J5	0Ω	.1Ω	†42KΩ	0Ω	6.8Meg	0Ω	0Ω		
V 8	6C4	†55KΩ	INF	0Ω	.1Ω	†55KΩ	300KΩ	2.2KΩ		
V 9	6L6G	0Ω	.1Ω	†205Ω	†1.6KΩ	300KΩ	†7.4KΩ	0Ω		
V 10	6L6G	0Ω	.1Ω	†205Ω	†1.6KΩ	600KΩ	†55KΩ	0Ω		
V 11	5U4G	INF	100KΩ	.5Ω	36Ω	INF	33Ω	INF	100KΩ	

■ MEASURED IN "AM" POSITION.
† MEASURED FROM PIN #2 OF V11.
ALL MEASUREMENTS MADE IN "FM" POSITION UNLESS OTHERWISE DESIGNATED.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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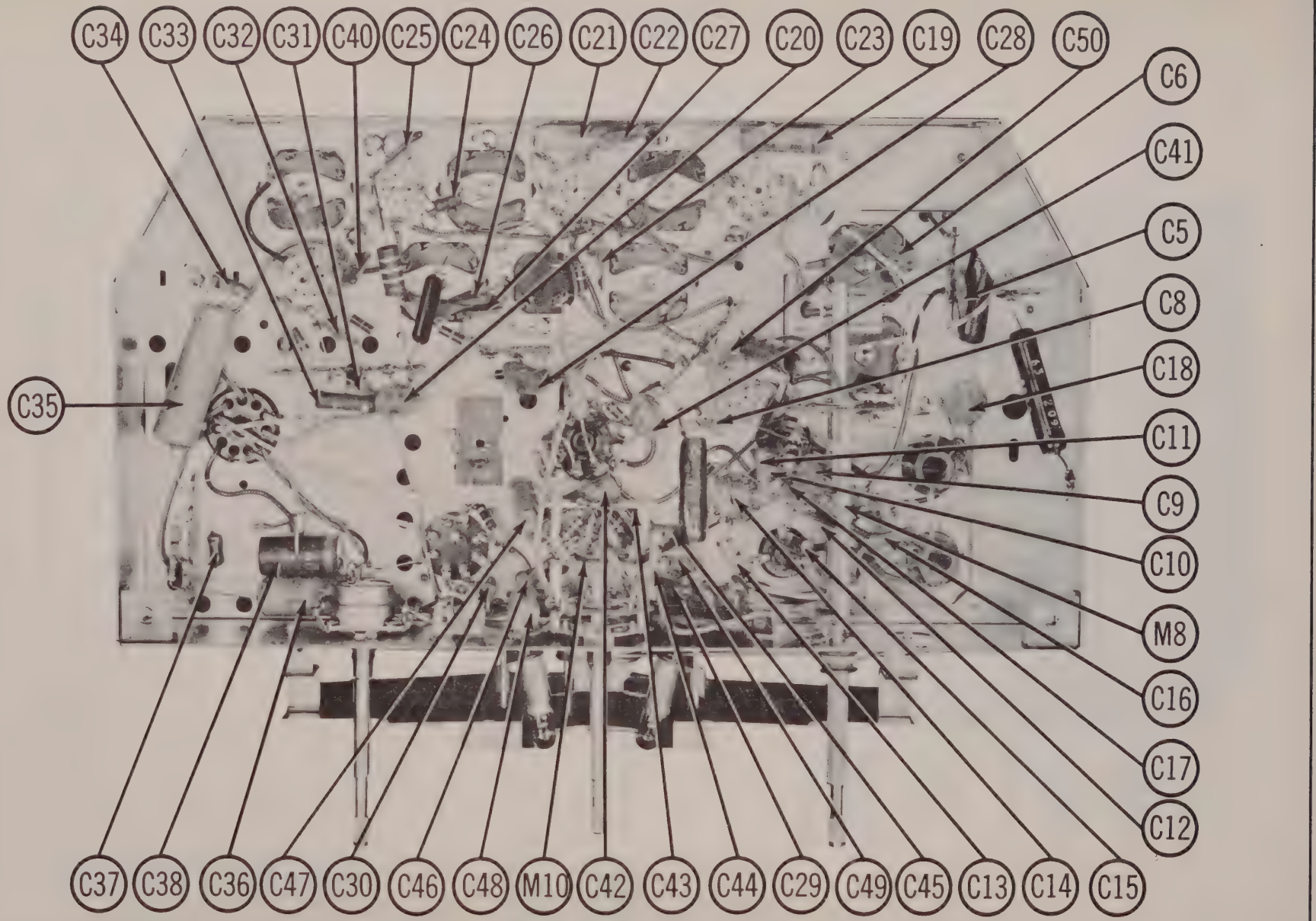
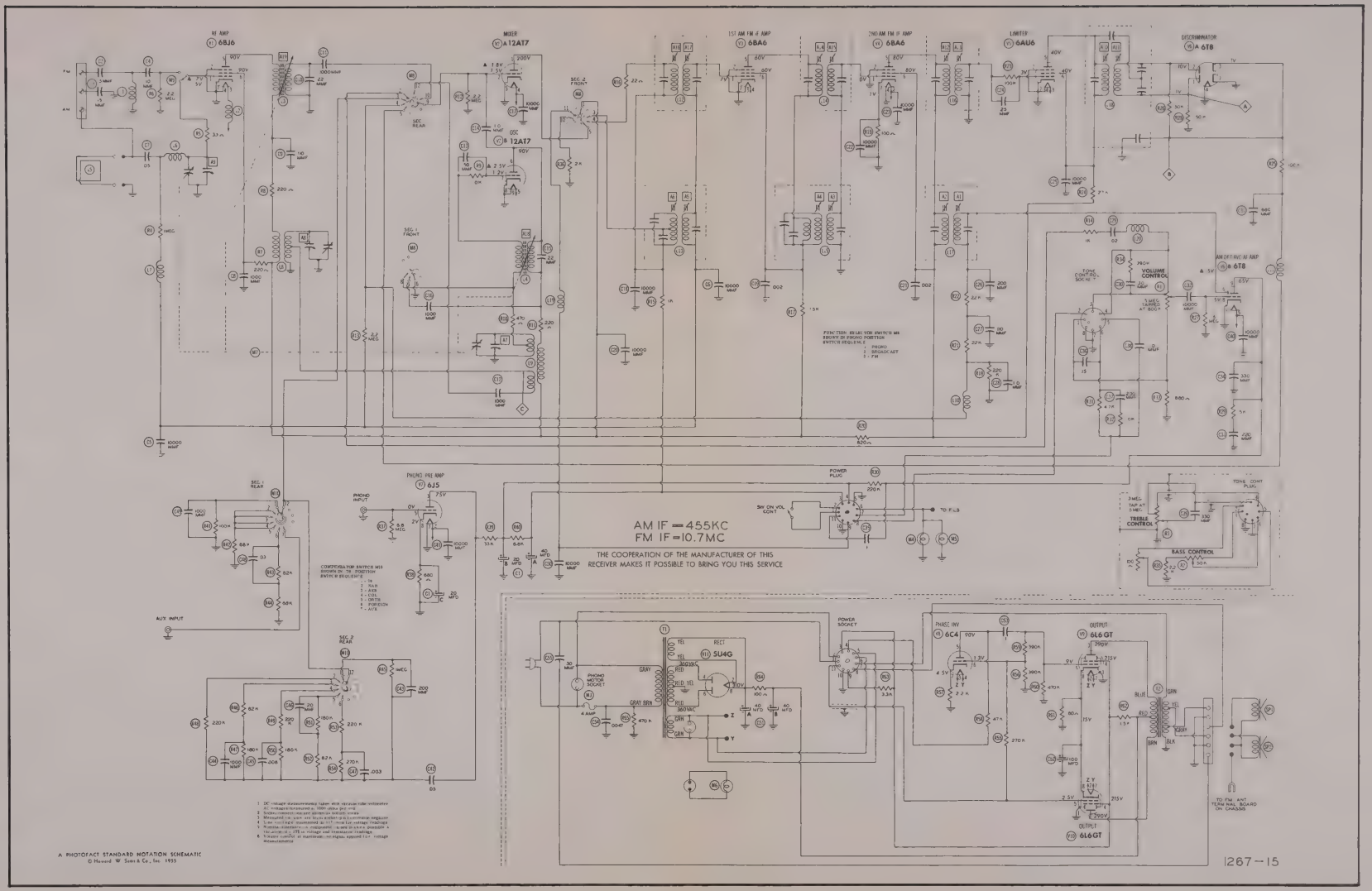
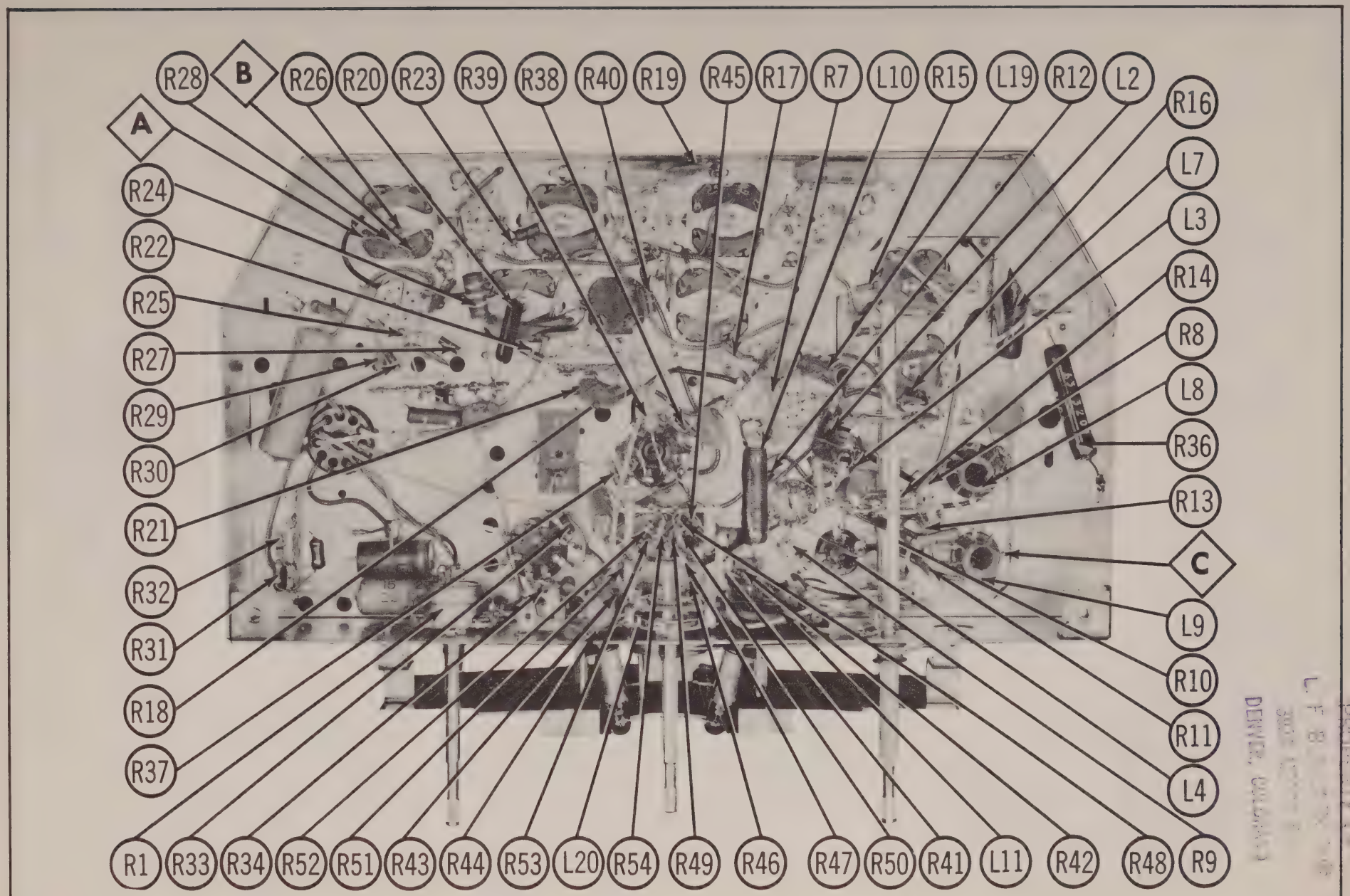


CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION


RF AMP
V1 6BJ6
MIXER
V2 A 12AT7
B 12AT7
1ST AM IF & AMP
V3 6BA6
2ND AM IF AMP
V4 6BA6
LIMITER
V5 6AU6
DISCRIMINATOR
V6 A 6T8
AM DET-AVC-AF AMP
V6 B 6T8
PHONO PRE AMP
V7 6J5
POWER SOCKET
PHASE INV
V8 6C4
OUTPUT
V9 6L6 GT
OUTPUT
V10 6L6 GT
RECT
V11 5U4G
VOLUME CONTROL
TONE CONTROL
TREBLE CONTROL
BASS CONTROL
AM IF = 455KC
FM IF = 10.7MC
THE COOPERATION OF THE MANUFACTURER OF THIS
RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1955
1267-15



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

L. F. B.
DENVER, COLORADO
PROPERTY OF

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE
		ZENITH PART No.	STANDARD REPLACEMENT	
V1	RF Amp.	6BJ6	6BJ6	6CH
V2	Mixer-Osc.	12AT7	12AT7	9A
V3	1st AM FM IF Amp.	6BA6	6BA6	7BK
V4	2nd AM FM IF Amp.	6BA6	6BA6	7BK
V5	Limiter	6AU6	6AU6	7BK
V6	Disc-AM-Det-AF Amp. -AVC	6T8	6T8	9E

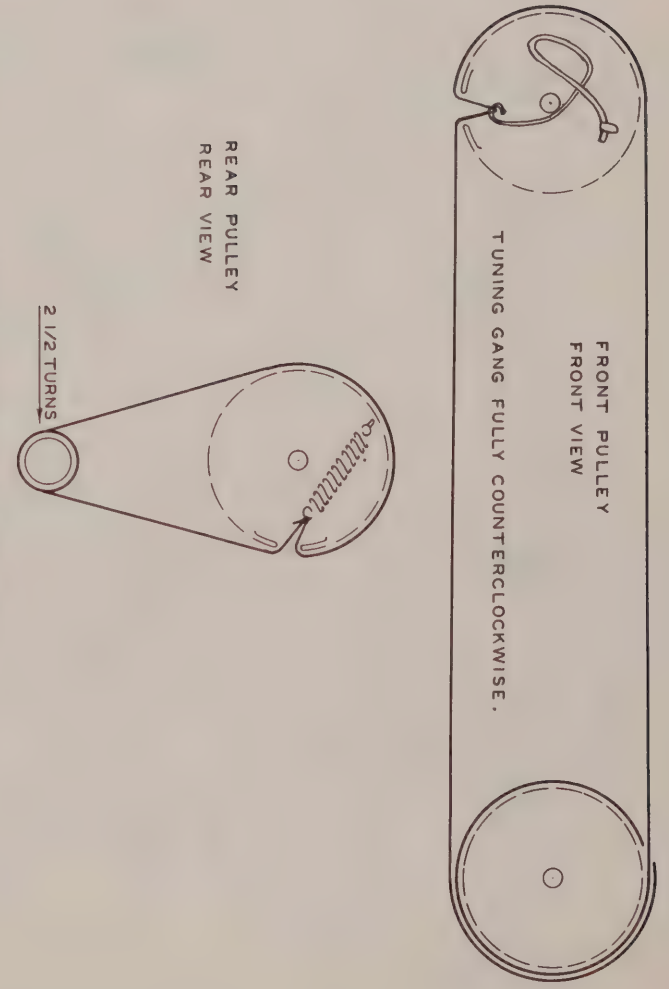
ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE
		ZENITH PART No.	STANDARD REPLACEMENT	
V7	Phono Pre-Amp.	6J5	6J5	6Q
V8	Phase Inverter	6C4	6C4	6BG
V9	Audio Output	6L6G	6L6G	7S
V10	Audio Output	6L6G	6L6G	7S
V11	Rectifier	5U4G	5U4G	5T

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							
	CAP.	VOLT	ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	▲40	450	22-2438	AFH3-132		C106		FP396.1	TVL-4729	
B	■20	450								
C	▲20	25								
C2	15		22-2140	SI15	D6-150	TP11	GP1K-150	UC-5415	5GA-Q15	
C3	15		22-2140	SI15	D6-150	TP11	GP1K-150	UC-5415	5GA-Q15	
C4	110		22-5	SI110	D6-111	G043	GP2K-111	UC-5311	5GA-T11	
C5	10000		22-3	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C6	10000		22-3	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C7	.05	200	22-829	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C8	1000		22-1676	SI1000	D6-102	TP52	GP2L-102	UC-521	5HK-D1	
C9	110		22-5	SI110	D6-111	G043	GP2K-111	UC-5311	5GA-T11	
C10	22		22-1506	SI22NP0	TCZ-22	TZ14	NP0K-220		5TCC-Q22	
C11	1000		22-1676	SI1000	D6-102	TP52	GP2L-102	UC-521	5HK-D1	
C12	1000		22-1676	SI1000	D6-102	TP52	GP2L-102	UC-521	5HK-D1	
C13	50		22-1367	SI50	D6-500	TP30	GP1K-500	UC-545	5GA-Q5	
C14	1.0		22-1762							
C15	22		22-1506	SI22NP0	TCZ-22	TZ14	NP0K-220		5TCC-Q22	
C16	1000		22-1676	SI1000	D6-102	TP52	GP2L-102	UC-521	5HK-D1	
C17	10000		22-3	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C18	10000		22-3	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C19	.002	600	22-1220	P688-002	D6-202	CUB6D2	GP2-333-202	PT622	6TM-D2	
C20	10000		22-3	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C21	.002	600	22-1220	P688-002	D6-202	CUB6D2	GP2-333-202	PT622	6TM-D2	
C22	10000		22-3	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C23	10000		22-3	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C24	25		22-1887	SI25	D6-250	TP25	GP1K-250	UC-5425	5GA-Q25	
C25	10000		22-3	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C26	200		22-2472	SI200N750	TCZ-200	TN29	N750-201		5TCU-T2	
C27	110		22-5	SI110	D6-111	G043	GP2K-111	UC-5311	5GA-T11	
C28	110		22-5	SI110	D6-111	G043	GP2K-111	UC-5311	5GA-T11	
C29	.02	600	22-830	P688-02	DF-203	CUB6S2		PT612	6TM-S2	
C30	30		22-1768	SI30NP0	TCZ-30	TZ17	NP0A-300			
C31	680		22-2387	SI680	D6-681	TP50	GP2L-681	UC-5368	5GA-T68	
C32	10000		22-3	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C33	220		22-2321	SI220	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	
C34	330		22-2309	SI330	D6-331	TP43	GP2K-331	UC-5333	5GA-T33	
C35	.1	600	22-417	P688-1	DF-104	CUB6P1		PT601	6TM-P1	
C36	.15	600	22-1025	P688-15		CUB6P15		PT6015	6TM-P15	
C37	200		22-1866	SI200	D6-201	TP38	GP2K-201	UC-532	5GA-T2	
C38	1.0	200	22-2584							
C39	330		22-2309	SI330NP0	TCZ-330		NP0A-331			
C40	10000		22-3	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C41	10000		22-3	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C42	.05	600	22-171	P688-05	DF-503	CUB6S5		PT615	6TM-S5	
C43	200		22-1866	SI200	D6-201	TP38	GP2K-201	UC-532	5GA-T2	
C44	1000		22-2218	SI1000	D6-102	TP52	GP2L-102	UC-521	5GA-D1	
C45	.008	600	22-1530	P688-008	D6-802	CUB6D8	GP2-333-802	PT628	6TM-D8	
C46	120		22-2279	SI120	D6-121	TP35	GP2K-121	UC-5312	5GA-T12	
C47	.003	600	22-288	P688-003	D6-302	CUB6D3	GP2-333-302	PT623	6TM-D3	
C48	.03	200	22-1520	P288-03		PJ2S3		PT413	2TM-S3	
C49	1000		22-2218	SI1000	D6-102	TP52	GP2L-102	UC-521	5GA-D1	
C50	10000		22-3	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C51A	■40	475	22-2581	AFH2-72		B053		FP262	TVL-2830	
B	▲40	475								
C52	100	50	22-2580	PRS50/100		BRH501		TC3501	TVA-1310	
C53	.1	600	22-1841	P688-1	DF-104	CUB6P1		PT601	6TM-P1	
C54	.0047	600	22-2579	P688-0047	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C55	30		22-1705	SI30	D6-300	TZ17	GP1K-300	UC-543	5GA-Q3	

DIAL CORD STRINGING



PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ZENITH PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	1.5Meg	½	63-2891	Q18-139X		ABT-82		Volume - tapped ⓐ 800KΩ.
B	Shaft		Not Req.	Not Req.		AK-4		Attach to R1A
C	Switch		Not Req.	76-1		KB-1		Attach to R1A
R2A	50KΩ	½	63-3216	Q13-123	A47-50K-2	AB-32	U-33	Bass
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-4	Not Req.	Attach to R2A
R3A	100Ω	2	63-3215					Treble - wire wound - tapped
B	3Meg	½						ⓐ 1.5Meg

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ZENITH PART No.	IRC PART No.	
R4	1Meg	½	63-1912	BTS-1Meg	
R5	33Ω	½	63-1723	BTS-33	
R6	2.2Meg	½	63-1926	BTS-2.2Meg	
R7	220Ω	½	63-1758	BTS-220	
R8	220Ω	½	63-1758	BTS-220	
R9	10KΩ	½	63-1827	BTS-10K	
R10	470Ω	½	63-1772	BTS-470	
R11	220Ω	½	63-1758	BTS-220	
R12	2.2Meg	½	63-1926	BTS-2.2Meg	
R13	2.2Meg	½	63-1926	BTS-2.2Meg	
R14	1000Ω	½	63-1786	BTS-1000	
R15	1000Ω	½	63-1786	BTS-1000	
R16	22Ω	½	63-1716	BTS-22	
R17	1500Ω	½	63-1793	BTS-1500	
R18	220KΩ	½	63-1884	BTS-220K	
R19	100Ω	½	63-1744	BTS-100	
R20	820Ω	½	63-2091		
R21	22KΩ	½	63-1842	BTS-22K	
R22	22KΩ	½	63-1842	BTS-22K	
R23	100KΩ	½	63-1870	BTS-100K	
R24	27KΩ	2	63-947	BTB-27K	
R25	100KΩ	½	63-1869	BTS-100K	
R26	150KΩ	½	63-1876	BTS-150K	
R27	15Meg	½	63-1961	BTS-15Meg	
R28	150KΩ	½	63-1876	BTS-150K	
R29	15KΩ	½	63-1835	BTS-15K	
R30	220KΩ	½	63-1884	BTS-220K	
R31	4700Ω	½	63-1813	BTS-4700	
R32	10KΩ	½	63-1827	BTS-10K	
R33	680Ω	½	63-1778	BTS-680	
R34	390KΩ	½	63-1894	BTS-390K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ZENITH PART No.	IRC PART No.	
R35	2200Ω	½		BTS-2200	
R36	2000Ω	10	63-3209		
R37	6.8Meg	½	63-1946	BTS-6.8Meg	
R38	680Ω	½	63-1778	BTS-680	
R39	33KΩ	1	63-957	BTA-33K	
R40	6800Ω	½	63-1820	BTS-6800	
R41	100KΩ	½	63-1869	BTS-100K	
R42	68KΩ	½	63-1862	BTS-68K	
R43	82KΩ	½	63-1866	BTS-82K	
R44	68KΩ	½	63-1862	BTS-68K	
R45	1Meg	½	63-1911	BTS-1Meg	
R46	82KΩ	½	63-1866	BTS-82K	
R47	180KΩ	½	63-1880	BTS-180K	
R48	220KΩ	½	63-1883	BTS-220K	
R49	220KΩ	½	63-1883	BTS-220K	
R50	180KΩ	½	63-1880	BTS-180K	
R51	180KΩ	½	63-1880	BTS-180K	
R52	82KΩ	½	63-1866	BTS-82K	
R53	220KΩ	½	63-1883	BTS-220K	
R54	270KΩ	½	63-1887	BTS-270K	
R55	270KΩ	½	63-1887	BTS-270K	
R56	390KΩ	½	63-1894	BTS-390K	
R57	2200Ω	½	63-1799	BTS-2200	
R58	47KΩ	½	63-1856	BTS-47K	
R59	390KΩ	½	63-1894	BTS-390K	
R60	470KΩ	½	63-1898	BTS-470K	
R61	180Ω	4	63-3211	PW4-180	
R62	1500Ω	10	63-3212		
R63	3300	12	63-3213		
R64	100Ω	5	63-3210		
R65	470KΩ	½	63-1898	BTS-470K	

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	ZENITH PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC ⓐ .68A	724VCT .170ADC	5VAC ⓐ 3A	6.3VAC 4.4A	95-1394			R-18A ①	P9318 ①	24R06U ①

① Drill new mounting holes, tape 6.3V center tap.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	ZENITH PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T2	7.7Ω CT	16Ω Tap ⓐ 8Ω ⓐ 4Ω	95-1395			S-31A ①	H4103 ①	22S98 ①	① Drill new mounting holes.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	ZENITH PART No.	JENSEN PART No.	QUAM PART No.	
SP1	12"	PM	8Ω	49-760			
SP2	3½"	PM	12Ω	49-759		3A15T	

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	ZENITH PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	FM RF Choke	0Ω		S-16408	19-3001		4602	1 Microhenry
L2	Fil. Choke	.9Ω		S-13997			4612	9.5 Microhenries
L3	FM RF Coil	0Ω	0Ω	S-15743				
L4	FM Osc. Coil	0Ω	0Ω	S-15691				
L5	AM Loop Ant.	.8Ω		S-17917				
L6	AM Ant. Loading Coil	3.4Ω		S-18812	19-3250	TV-185	4646	223 Microhenries
							4608	4.3 Microhenries
L7	RF Choke	.1Ω						
L8	AM RF Coil	3.1Ω	12Ω ††	S-16344				
L9	AM Osc. Coil	1.6Ω	9Ω ¶	S-16345				Pick-up winding 1.3Ω
L10	RF Choke	.1Ω					4608	4.3 Microhenries
L11	RF Choke	.1Ω					4608	4.3 Microhenries
L12	1st. FM IF	.5Ω	.5Ω	95-1201	16-6665 ▲	FM-251	1451	
L13	1st. AM IF	15Ω♦	16Ω	95-1248				
L14	2nd. FM IF	.4Ω	.4Ω	95-1150	16-3487 †	FM-251 *	1451 *	
L15	2nd. AM IF	16.5Ω	17Ω	95-1249				Tertiary winding (Primary) .4Ω
L16	3rd. FM IF	.4Ω	.4Ω	95-1150	16-3487 †	FM-251 *	1451 *	
L17	3rd. FM IF	17Ω	12Ω	95-1254	16-5742 *	BC-340 *	912-C4*	
L18	Discriminator	.4Ω	.4Ω	95-1153	17-3484 ▬	FM-250 ■	1452 ■	
L19	RF Choke	.1Ω					4608	4.3 Microhenries
L20	RF Choke	.1Ω					4608	4.3 Microhenries

* Remove center spade bolt mounting support.
■ Add diode filter capacitor externally and remove center spade bolt mounting support.
▲ Drill new mounting holes.
† Remove center spade bolt mounting support.
▬ Add diode filter capacitor externally, drill mounting holes and remove center spade bolt mounting support.
¶ Tapped ⓐ 3.8Ω.
†† Tapped ⓐ .4Ω .
♦ Tapped ⓐ 5Ω.

FUSES

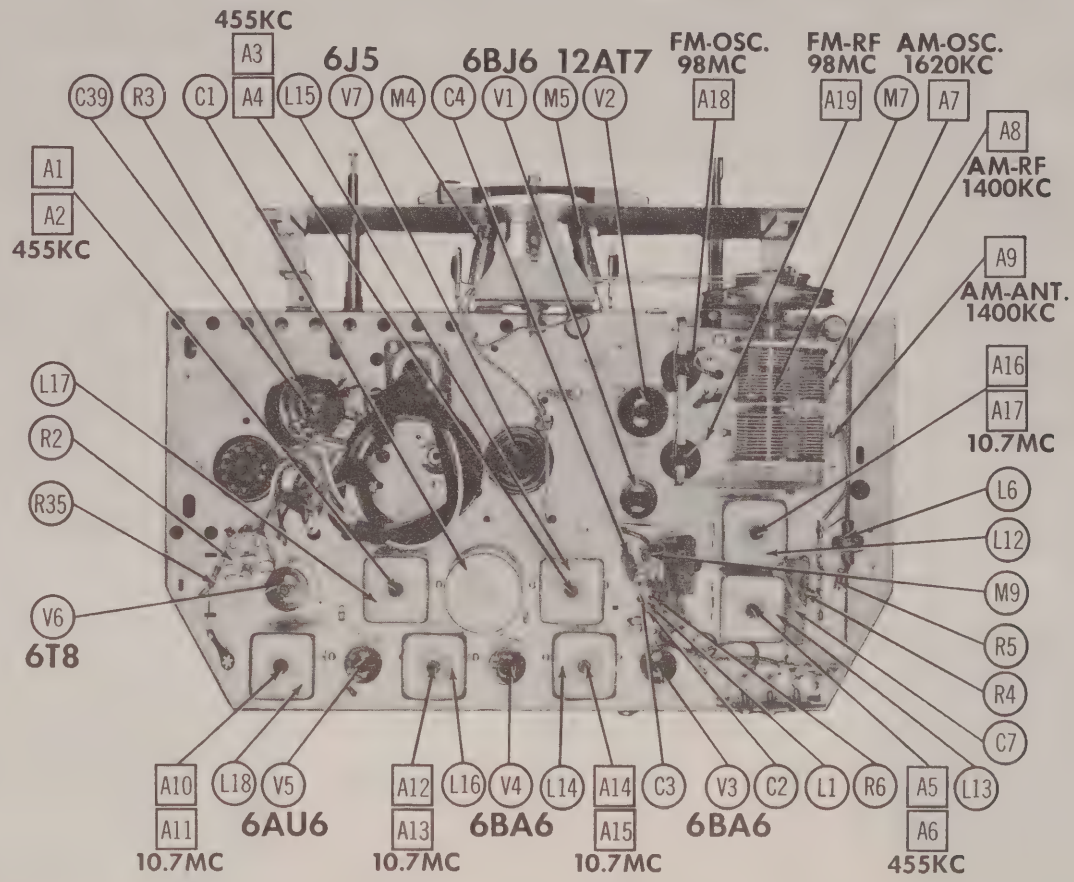
ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			ZENITH PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	4A 250V	136-31		312004 (4A-3AG)	342001	MTH4	HKP

PHONO CARTRIDGE

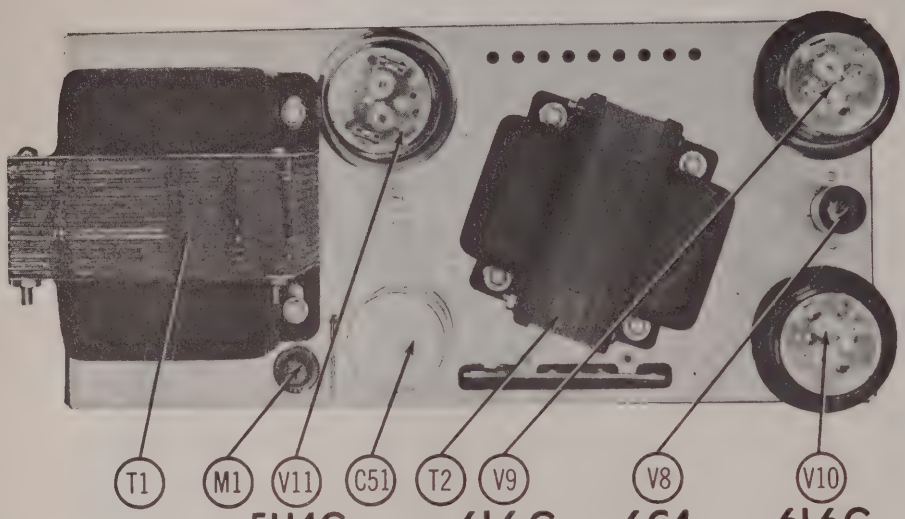
ITEM No.	REPLACEMENT DATA							REMARKS
	ZENITH PART No.	ASTATIC PART No.		SHURE PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M2	142-72							33 1/3-45-78 Records
M3	142-74							33 1/3-45 Records only

MISCELLANEOUS

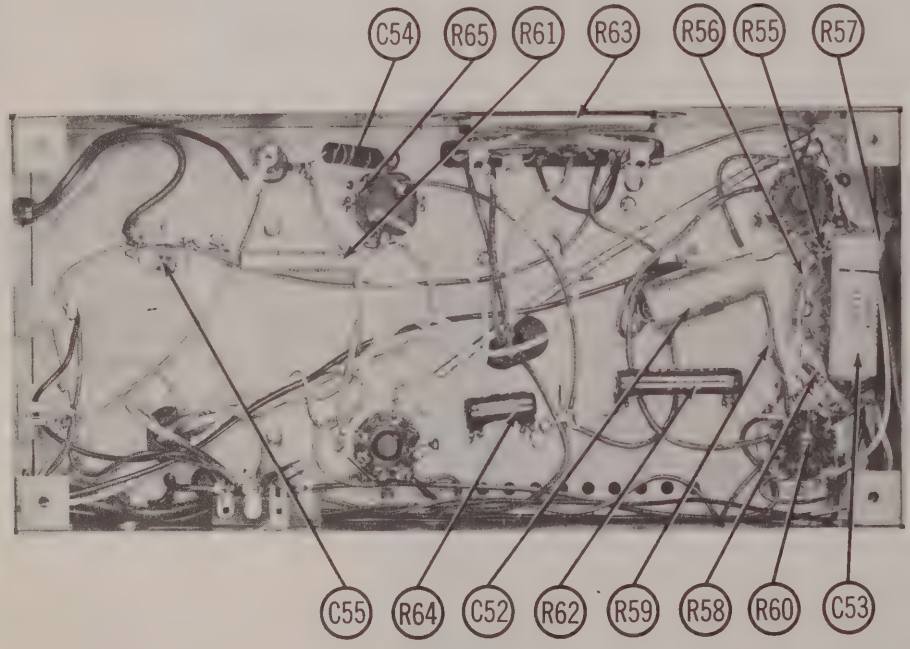
ITEM No.	PART NAME	ZENITH PART No.	NOTES
M4	Dial Light	100-67	#47, Bayonet
M5	Dial Light	100-67	#47, Bayonet
M6	Dial Light	100-67	#47, Bayonet - Cabinet Jewel
M7	Tuning Cap.	22-2400	18-370MMF; 11-200MMF; 11-85MMF.
M8	Switch	85-552	Band
M9	Switch	85-505	FM-AM
M10	Switch	85-553	Phono Compensator
	Cabinet	14-1721E	Model HF-M1184E
	Cabinet	14-1709R	Model HF-M1190R
	Knob	S-19316	Volume Cont. Ass'y.
	Knob	46-1041	Tuning
	Knob	46-1043	Phono Compensator & Bandswitch
	Knob	46-1153	Tone - 2 used
	Dial Crystal	192-138	
	Dial Pointer	59-249	



CHASSIS TOP VIEW



POWER SUPPLY CHASSIS-TOP VIEW



POWER SUPPLY CHASSIS-BOTTOM VIEW

ALIGNMENT INSTRUCTIONS

AM ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
To set pointer, turn tuning capacitor fully closed and set pointer parallel with base of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05MFD	High side to pin 2 (grid) of 12AT7 (V2). Low side to chassis.	455KC (400~Mod)	BC	600KC	Across voice coil	A1, A2, A3, A4, A5, A6	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	High side to AM antenna terminal. Low side to chassis.	1620KC	"	Tuning gang fully open	"	A7	Adjust for maximum output.
3.	"	"	1400KC	"	"	"	A8, A9	"

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Use only enough signal generator output to provide usable indication on VTVM. Temporarily increase generator output when adjusting A11.
Use a 2Meg isolation resistor in series with DC probe of VTVM.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.	.05MFD	High side to pin 1 (grid) of 6AU6 (V5). Low side to chassis.	10.7MC (Unmod)	FM	Point of non-interference	DC probe to point Ⓐ. Common to ground.	A10	Adjust for maximum deflection.
5.	"	"	"	"	"	DC probe to point Ⓑ. Common to ground.	A11	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
6.	"	High side to pin 1 (grid) of 6BA6 (V4). Low side to chassis.	"	"	"	DC probe to pin 1 (grid) of 6AU6 (V5).	A12, A13	Adjust for maximum deflection.
7.	"	High side to pin 1 (grid) of 6BA6 (V3). Low side to chassis.	"	"	"	"	A14, A15	"
8.	"	High side to point Ⓒ. Low side to chassis.	"	"	"	"	A16, A17	Adjust for maximum deflection. Repeat steps 6, 7 and 8.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.
Use only enough sweep generator output to provide usable indication on scope.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
4.	.05MFD	High side to pin 1 (grid) of 6AU6 (V5). Low side to chassis.	10.7MC (450KC Swp)	FM	Point of non-interference	Vert. Amp. to point Ⓐ. Common to chassis.	A10	Adjust for curve of maximum amplitude and symmetry as in Fig. 1.
5.	"	"	"	"	"	Vert. Amp. to point Ⓑ. Common to chassis.	A11	Adjust so that 10.7MC occurs at center of crossover lines as in Fig. 2. SLIGHTLY retouch A10 for maximum amplitude and straightness of crossover lines.
6.	"	High side to pin 1 (grid) of 6BA6 (V4). Low side to chassis.	"	"	"	DC probe to pin 1 (grid) of 6AU6 (V5).	A12, A13	Adjust for curve of maximum amplitude and symmetry as in Fig. 1.
7.	"	High side to pin 1 (grid) of 6BA6 (V3). Low side to chassis.	"	"	"	"	A14, A15	"
8.	"	High side to point Ⓒ. Low side to chassis.	"	"	"	"	A16, A17	"

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
9.	270Ω Carbon Resistor	High side thru 270Ω to FM antenna terminal. Low side to terminal "G".	98MC (Unmod)	FM	98MC	DC probe to pin 1 (grid) of 6AU6 (V5). Common to chassis.	A18 A19	Adjust in order given for maximum deflection.

FIG. 1

FIG. 2

PHOTOFACT* Folder

*TRADE MARK

RETMA MEMBER

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MODEL R1812E

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ZENITH MODEL R1812E

TRADE NAME	Zenith	MODELS	CHASSIS
		R1800E, EU, R, RU, R1812E, EU, R, RU	19R20, U
		R2229E, EU, R, RU, R2230E, EU, R, RU, R2249E, EU, R, RU, R2250E, EU, R, RU,	
		R2253M, MU, R2258E, EU, R, RU	19R21, U
		R2257E, EU, R, RU	19R22, U
MANUFACTUER	Zenith Radio Corp., 6001 Dickens Ave., Chicago 39, Illinois		
TYPE SET	Television Receiver		
TUBES	Nineteen		
POWER SUPPLY	110-120 Volts AC-60 Cycles	RATING 1.56 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

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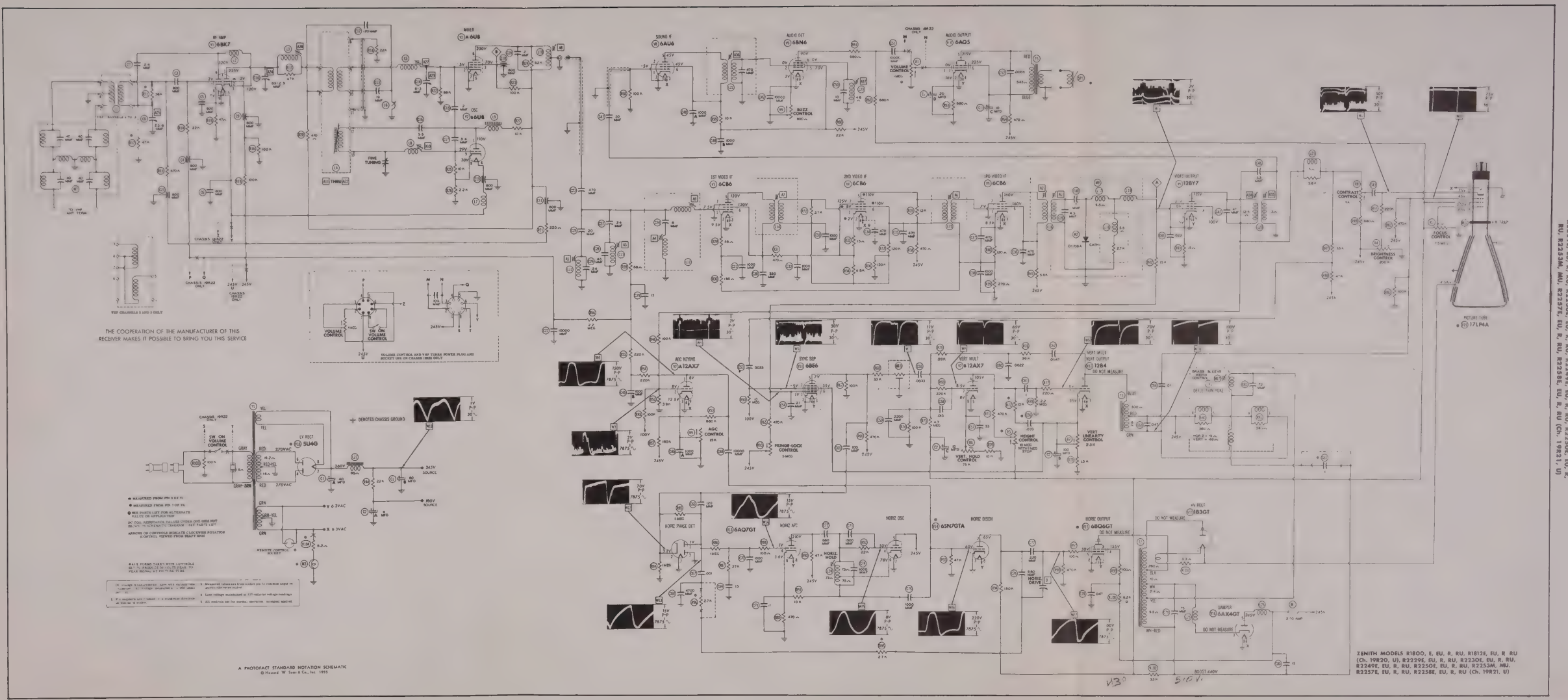
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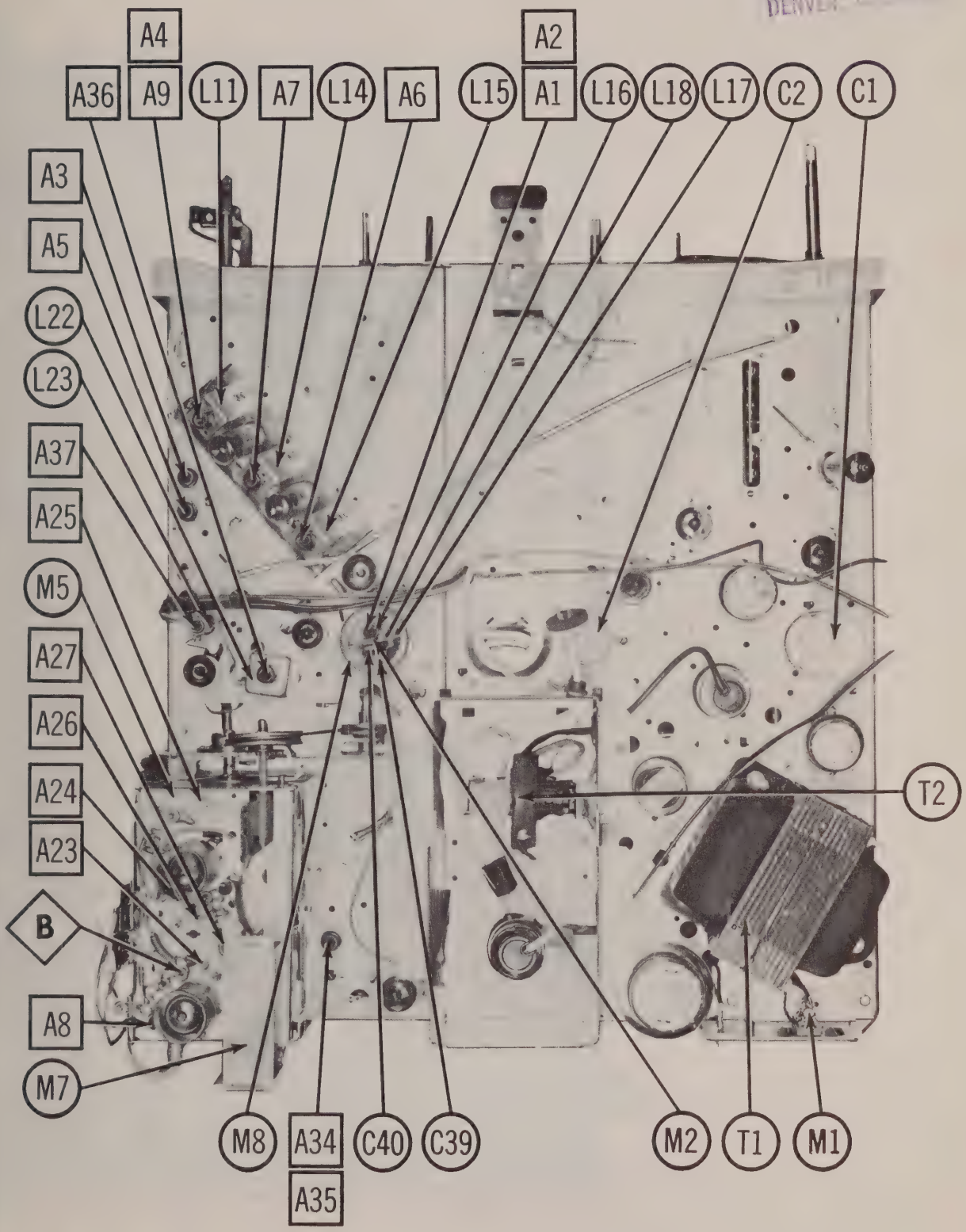
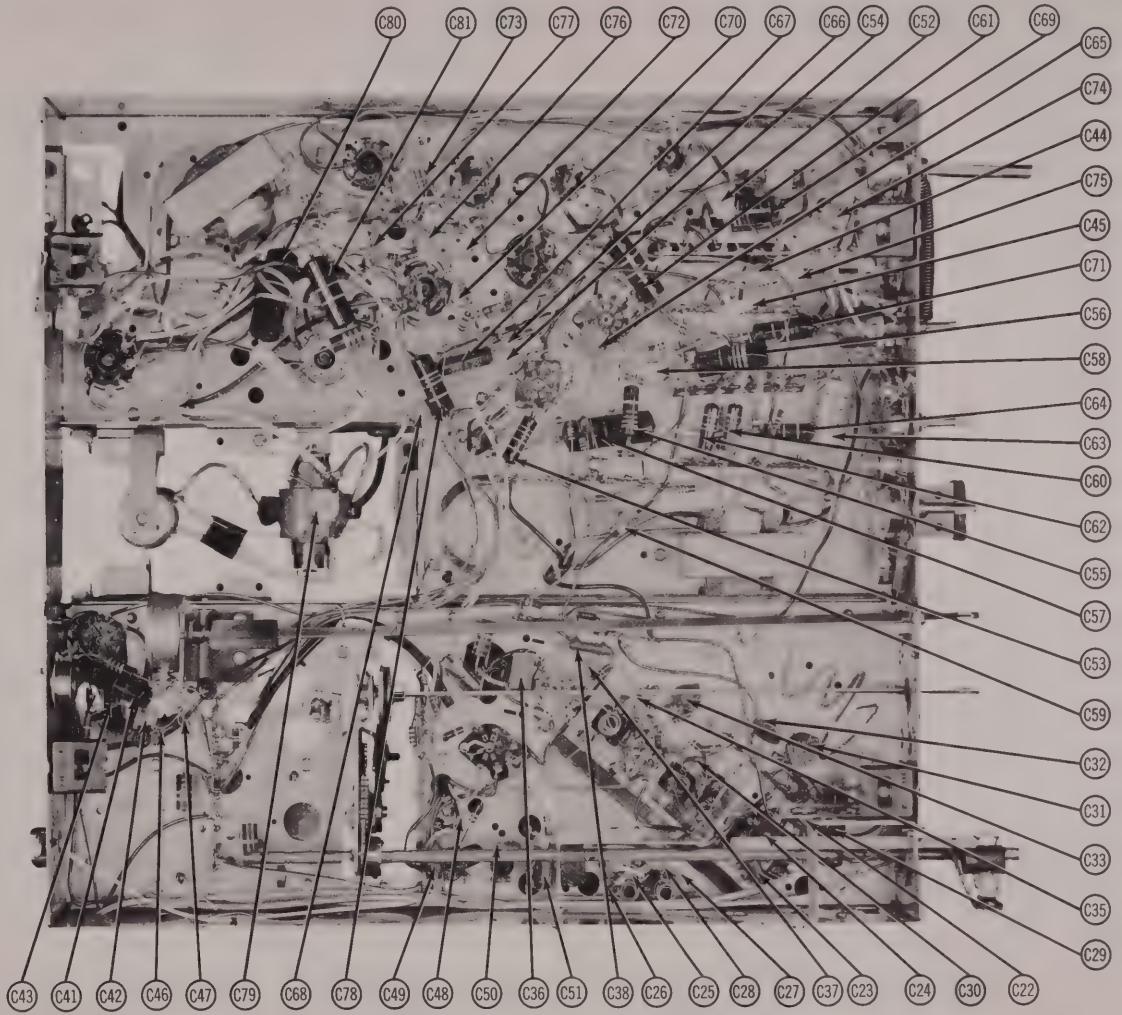


CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

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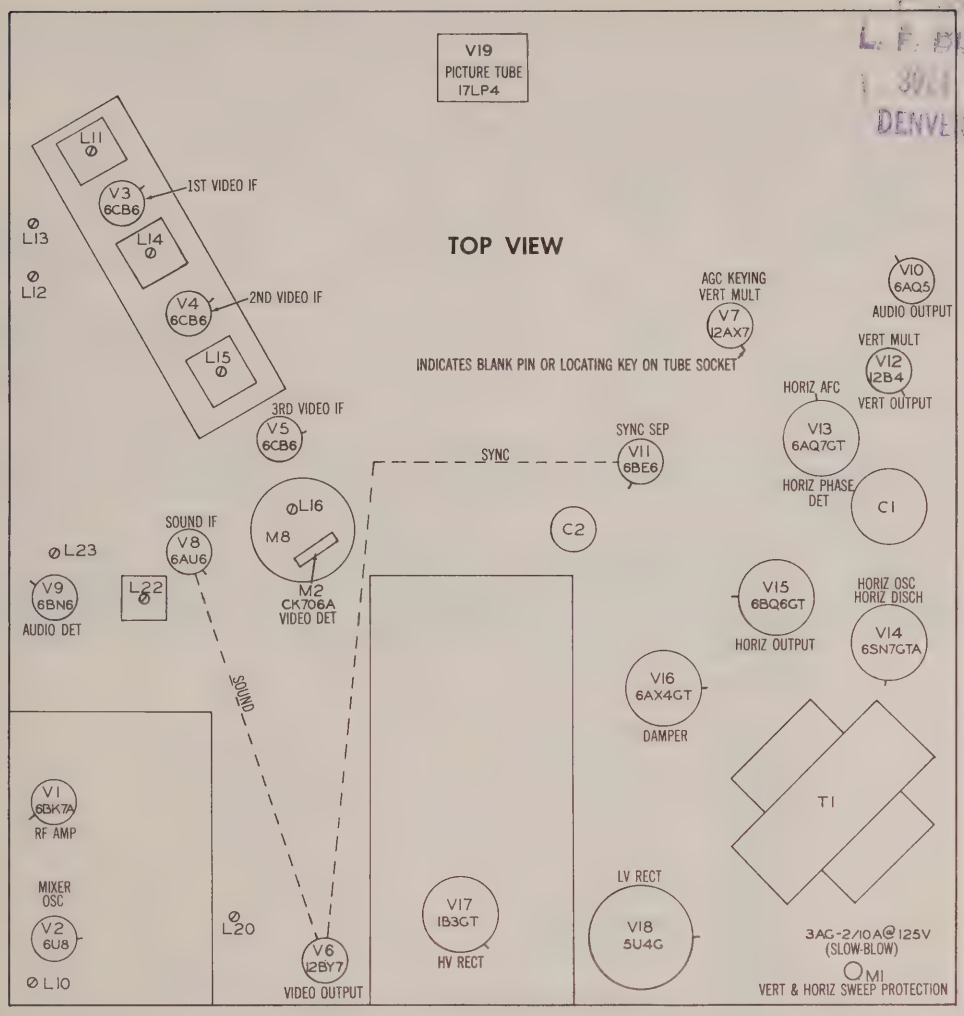
TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **V18**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V6**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V6, V7, V19**
Has pic, no sound - **V8, V9, V10**
Overloaded picture - **V7**

SYNC FAILURE
No vert. sync - **V7, V11, V12**
No horiz. sync - **V11, V13, V14**
No vert. or horiz. sync - **V11**

SWEEP FAILURE
No raster, has sound - **V14, V15, V16, V17, V19, Fuse (M1)**
No vertical deflection - **V7, V12**
Poor vert. linearity or foldover - **V7, V12**
Poor horiz. linearity or foldover - **V14, V15, V16**
Narrow picture - **V14, V15, V16, V17, V18**
Vert. off freq. - **V7, V11, V12**
Horiz. off freq. - **V11, V13, V14**

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ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

If the set is to be aligned with the picture tube removed, the end of the high voltage lead should be securely taped and kept away from the chassis.

VIDEO IF ALIGNMENT

Turn the tuner turret to position mid-way between two channels.
Connect the negative lead of a 2 volt bias supply to the junction of R54 and R56. Connect the positive lead to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	470MMF	High side to pin 1 (grid) of 6CB6 (V5). Low side to chassis.	44MC (10MC Swp)	39.75MC 45.75MC	See note above	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A1, A2	Adjust for response curve similar to Fig.1. If correct response cannot be obtained, check to see that the slugs are entering the coils from the outside ends of coils.
2.	"	High side to point B. Low side to chassis.	"	39.75MC 41.25MC 47.25MC	"	"	A3, A4, A5	Reduce bias to zero. Turn sweep generator output to maximum. Increase gain on scope to magnify trap portions of response curve. Adjust traps for response similar to Fig.2.
3.	"	"	"	42.75MC 45.0MC 45.75MC	"	"	A6, A7, A8, A9	Replace 2 volt bias. Adjust for response curve similar to Fig. 3. Readjustment of A1 and A2 should not be required to obtain proper response.

OSCILLATOR ALIGNMENT

The master oscillator adjustment A10 is to be made only if the individual channel oscillator adjustments fail to bring all channels within the range of the fine tuning control. If channels 2 thru 6 fall within the range of the fine tuning control, but the high channels do not, slight readjustment of A10 may bring the high channels in.
Ground the AGC lead from the tuner (yellow lead) to chassis.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead	57MC (10MC Swp)	59.75MC	2	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A11	Adjust to place sound marker in trap notch as shown in Fig. 4.
			63MC (10MC Swp)	65.75MC	3		A12	
			69MC (10MC Swp)	71.75MC	4		A13	
			79MC (10MC Swp)	81.75MC	5		A14	
			85MC (10MC Swp)	87.75MC	6		A15	
			177MC (10MC Swp)	179.75MC	7		A16	
			183MC (10MC Swp)	185.75MC	8		A17	
			189MC (10MC Swp)	191.75MC	9		A18	
			195MC (10MC Swp)	197.75MC	10		A19	
			201MC (10MC Swp)	203.75MC	11		A20	
			207MC (10MC Swp)	209.75MC	12		A21	
			213MC (10MC Swp)	215.75MC	13		A22	

RF AND MIXER ALIGNMENT

Ground the AGC lead from the tuner (yellow lead) to chassis.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	69MC (10MC Swp)	67.25MC 71.75MC	4	Vert. Amp. to point (B). Low side to chassis.	A23, A24, A25	Adjust for response curve similar to Fig.5.
6.	"	"	201MC (10MC Swp)	199.25MC 203.75MC	11	"	A26, A27	Adjust for response curve similar to Fig. 5. If passband is not correct SLIGHTLY bend L6. (Slotted tab in shield plate). Repeat steps 5 and 6 for optimum results on all channels.

FIG. 1

FIG. 2

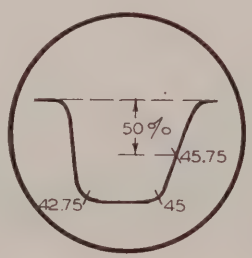

FIG. 3

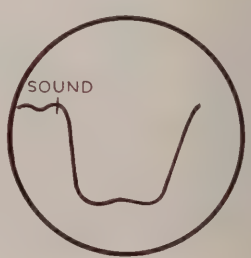

FIG. 4

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ALIGNMENT INSTRUCTIONS (cont)

UHF TUNER ALIGNMENT

Any attempt to peak any one particular channel will usually cause serious degradation of the other channels.
No attempt should be made to adjust the oscillator unless the calibration is off more than 3 channels. Turn the UHF tuning dial to channel 54. The rocker arm of the tuner should be horizontal. If it is not, loosen the set screw on the drive pulley and turn the tuner shaft independantly of the pully until the rocker arm is horizontal with the channel indicator at channel 54. Tighten the set screw.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Two 120Ω Carbon Resistors	Across UHF antenna terminals with 120Ω in each lead.	713MC (10MC Swp)	711.25MC	54	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A28 A29 A30	Adjust for response curve similar to Fig. 6. When adjusting the oscillator adjustment (A28) two responses may be found, the correct response is the one with the adjustment in the most counter clockwise position.
8.	"	"	473MC (10MC Swp)	471.25MC	14	"		Check for response similar to Fig. 6. If the oscillator is off calibration more than 3 channels adjust the oscillator travel (osc. mixer and ant. travel adjustments are the round thumb screws on top of the tuner) adjustment to scale. Care must be exercised when making this adjustment not to move the rocker arm out of its bearing. Adjust the mixer and ant. travel adjustments for maximum amplitude response.
9	"	"	887MC (10MC Swp)	885.25MC	83	"	A31, A32, A33	Adjust A31 to place marker at 50% as in Fig. 6. Adjust A32 and A33 for maximum amplitude of response.

Check calibration on 14, 54 and 83. If necessary repeat steps 7, 8 and 9.

SOUND ALIGNMENT

Connect an attenuator (Zenith part no. S-17203 or equivalent) in series with the receiver antenna. Tune in a TV signal and adjust the attenuator until the signal falls below the limiting level of the 6BN6 audio detector, as evidenced by a hiss similar to super-regeneration.
Adjust the sound take-off transformer (A34 and A35), the sound IF coil (A36) and the quadrature coil (A37) for maximum sound of best quality.
Adjust the buzz control R9 for minimum intercarrier buzz. If the buzz cannot be eliminated with the buzz control, check the setting of the AGC control.
If during any of the sound IF adjustments the signal rises above the limiting level, (hiss disappears), increase the attenuation until the hiss returns.

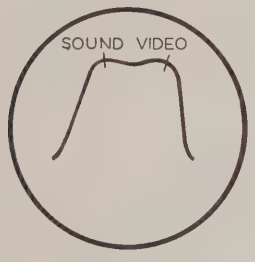

FIG. 5

FIG. 6

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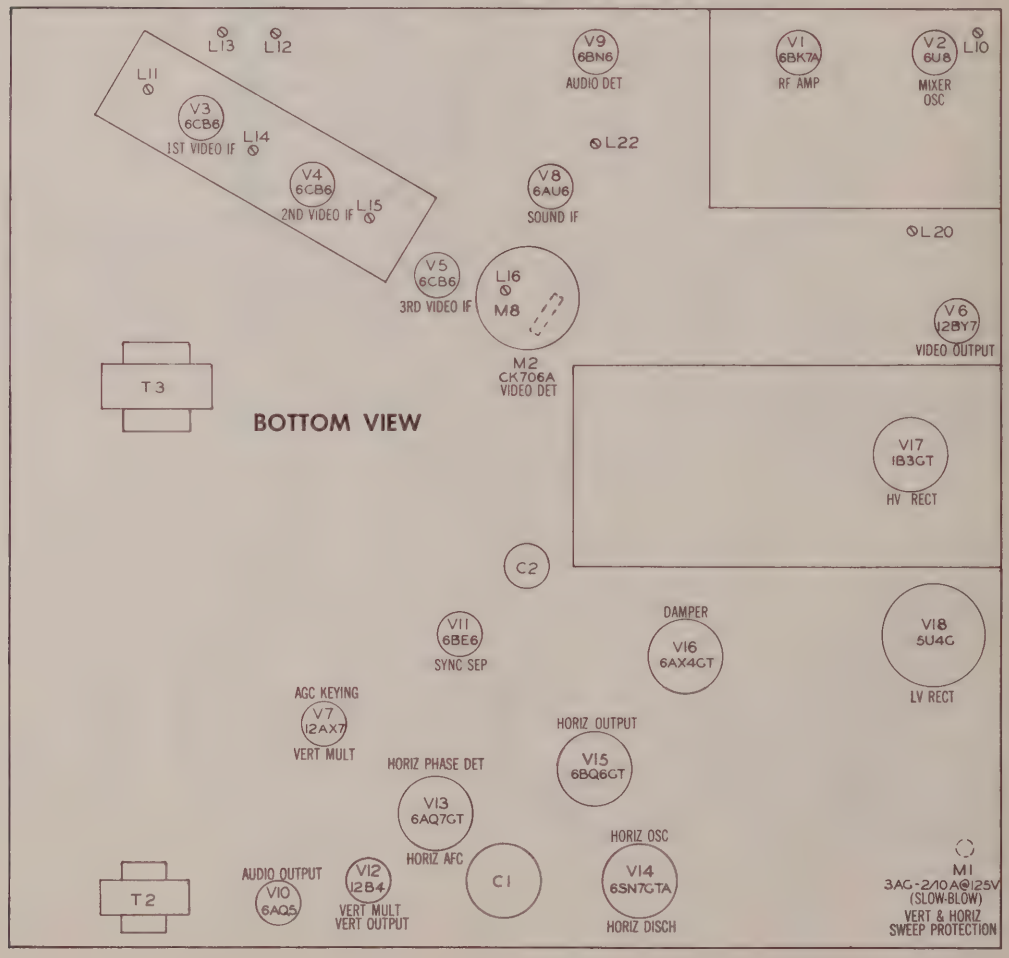
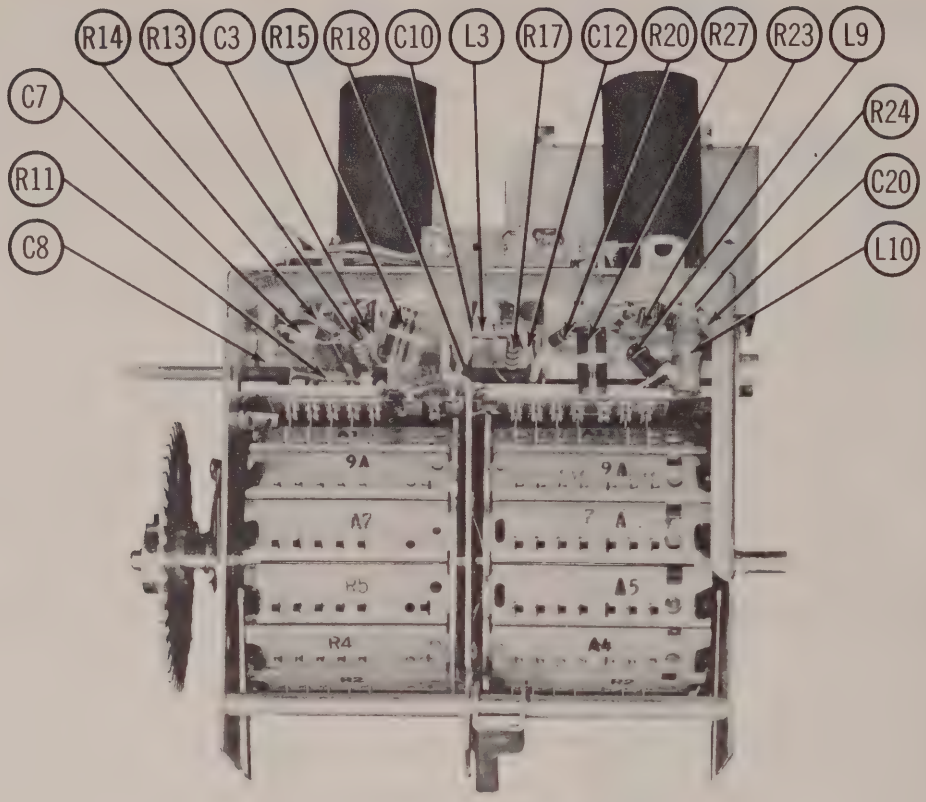
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BK7A	†750Ω	†50KΩ	INF	0Ω	.1Ω	INF	3.2Meg	47Ω	0Ω
V 2	6U8	†10.3KΩ	68KΩ	†100KΩ	.1Ω	0Ω	†300Ω	0Ω	2.2KΩ	12KΩ
V 3	6CB6	1.2Meg	500Ω	.1Ω	0Ω	■500Ω	■500Ω	0Ω		
V 4	6CB6	■6.8KΩ	■15Ω	.1Ω	0Ω	†500Ω	†500Ω	70KΩ		
V 5	6CB6	270Ω	400Ω	.1Ω	0Ω	†5.6KΩ	†5.6KΩ	0Ω		
V 6	12BY7	15Ω	3KΩ	15Ω	0Ω	0Ω	.1Ω	†5.5KΩ	†22KΩ	15Ω
V 7	12AX7	†750KΩ	3.9KΩ	9KΩ	0Ω	0Ω	▲2.2Meg	320KΩ	40KΩ	.1Ω
V 8	6AU6	100KΩ	0Ω	.1Ω	0Ω	†32KΩ	†32KΩ	0Ω		
V 9	6BN6	350Ω	.3Ω	.1Ω	0Ω	†22KΩ	4.6Ω	▲700KΩ		
V 10	6AQ5	420KΩ	680Ω	0Ω	.1Ω	†1.2KΩ	†550Ω	420KΩ		
V 11	6BE6	18KΩ	0Ω	.1Ω	0Ω	†100KΩ	3KΩ	†10Meg		
V 12	12B4	3KΩ	2.2Meg	.1Ω	0Ω	0Ω	2.2Meg	2.2Meg	INF	†560Ω
V 13	6AQ7GT	2Meg	1Meg	0Ω	3Meg	†47KΩ	470Ω	0Ω	.1Ω	
V 14	6SN7GTA	47KΩ	▲230KΩ	0Ω	32KΩ	†66Ω	10.5KΩ	0Ω	.1Ω	
V 15	6BQ6GT	†12KΩ	.1Ω	470KΩ	†8.2KΩ	470KΩ	INF	0Ω	0Ω	TOP CAP ▲10Ω
V 16	6AX4GT	INF	INF	130KΩ	130KΩ	†80Ω	†80Ω	.1Ω	0Ω	
V 17	1B3GT		PINS	1 - 8	HAVE	INF	RESISTANCE			TOP CAP ▲270Ω
V 18	5U4G	INF	30KΩ	†66Ω	16Ω	INF	18Ω	INF	30KΩ	
V 19	17LP4A	0Ω	†100KΩ	PIN 6 ▲1.7Meg	PIN 10 ▲33KΩ	PIN 11 †250KΩ	PIN 12 .1Ω			

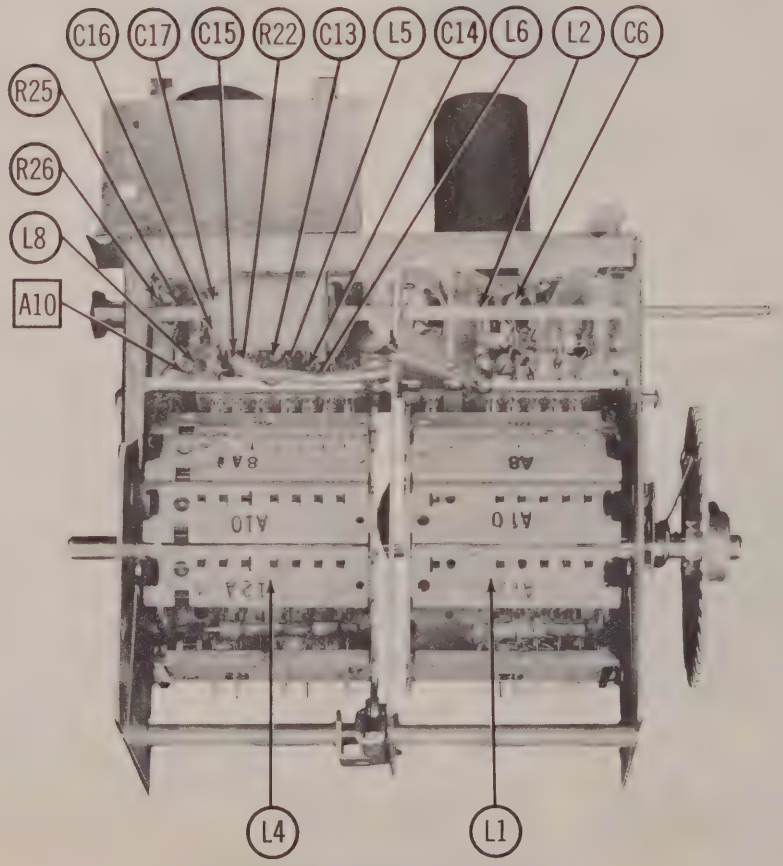
† MEASURED FROM PIN 2 OF V18
■ MEASURED FROM PIN 7 OF V4
▲ MEASURED FROM PIN 3 OF V16



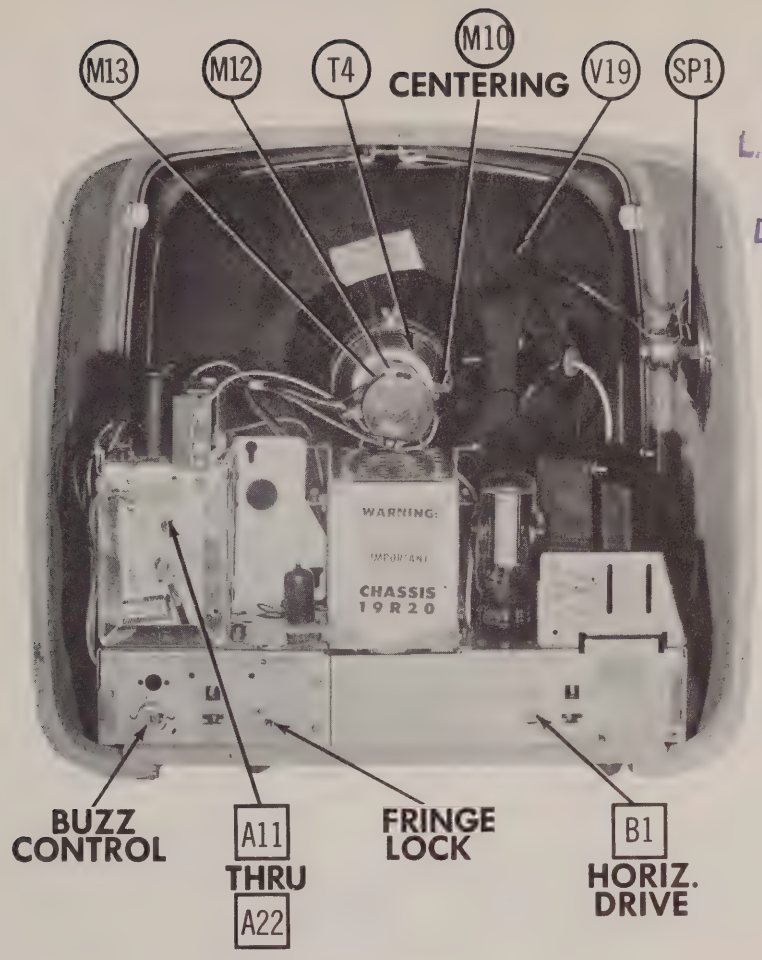
TUBE PLACEMENT CHART



RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE



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CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Adjust the horizontal hold control until the picture synchronizes horizontally.

Adjust the horizontal drive trimmer (B1) for greatest picture width.

Adjust the width adjustment (brass sleeve around neck of picture tube) until the picture is slightly wider than necessary to fill the mask horizontally.

AGC DELAY CONTROL ADJUSTMENT

Connect the vertical input lead of an oscilloscope thru a 10KΩ resistor to point Ⓐ . Tune in the strongest available station and adjust the AGC control for a 2 volt peak to peak signal.

FRINGE LOCK ADJUSTMENT

Turn the fringe lock control to 1/4 turn from fully clockwise. Adjust the vertical and horizontal hold for picture synchronization and check stability by switching off channel and back again. If necessary retouch fringe lock adjustment for maximum stability while testing as above.

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V15, V16 and V18. Check adjustment B1. Check R100, R96, C76, C77, T2, T4A and other associated components.

DRIVE LINES

Check by substitution V15 and V16. Check adjustment B1. Check R94, R96, R100, C77, C76, T2 and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V15 and V16. Check horizontal output and damper stages for component failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V13, V14, V15 and V16. Check C70 for open. Check L24, C74, C71 and other associated components.

XMAS TREE EFFECT

Check by substitution V13, V14, V15 and V16. Check T2 and T4A for internal arcing. Check L24, C74, C72, C73, C75, R94, R90 and other associated components.

VERTICAL

LOSS OF SWEEP

Check by substitution V7 and V12. Check waveform W9.

If Satisfactory	If Unsatisfactory
Check T3, T4B, R79, R7, C2B and other associated components.	Check C61, R71, R3, R102 and other associated components.

INSUFFICIENT SWEEP

Check by substitution V7 and V12. Check height and vertical linearity controls for proper operation. Check T3, T4B, R71 and other associated components.

COMPRESSED AT BOTTOM

Check by substitution V7 and V12. Check R102, R71, R3, R73, C56 and other associated components.

COMPRESSED AT TOP

Check by substitution V7 and V12. Check R7, R79, C2B, T3 and other associated components.

FOLDS

Check by substitution V7 and V12. Check R73, R79, C56, C61, T3, T4B and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Substitute V11. Check C53, C54, R79, R66 and other associated components.

LOSS OF VERTICAL SYNC-HORIZONTAL SYNC SATISFACTORY

Substitute V7. Check M13, C55, C57, C59, R70, R6 and other associated components.

LOSS OF HORIZONTAL SYNC-VERTICAL SYNC SATISFACTORY

Substitute V13. Check L24, C74, C70, C65, C66, R90, R89 and other associated components.

HORIZONTAL BENDING

Check by substitution V7, V11 and V13. Check horizontal AFC network.

VIDEO

LOSS OF VIDEO

Substitute V6. Check R44, R49, C2A, C42, C43, L20 and other associated components.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check adjustment A34. Check video IF alignment.

POOR CONTRAST

Substitute V6. Check L21, C43, C41, R43 and contrast control. Check video crystal detector network.

NEGATIVE PICTURE

Substitute V6. Check picture tube. Check video crystal detector network. Check C43, C42, L19 and other associated components.

SMEAR

Substitute V6. Check video crystal detector. Check L19, L21, C43 and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitute V1, V3, V4, V5 and V6 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V8, V9 and V10. Check stage V10 using audio signal generator. Apply audio signal across R1.

If Satisfactory	If Unsatisfactory
Check audio detector and audio IF stages for component failure or change of value.	Check C51, C52, C1C, R64, R63, T5, speaker and other associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustments R9 and A37. If still unsatisfactory, check audio IF alignment.

DISTORTED

Follow procedure outlined under "Weak or No Sound".

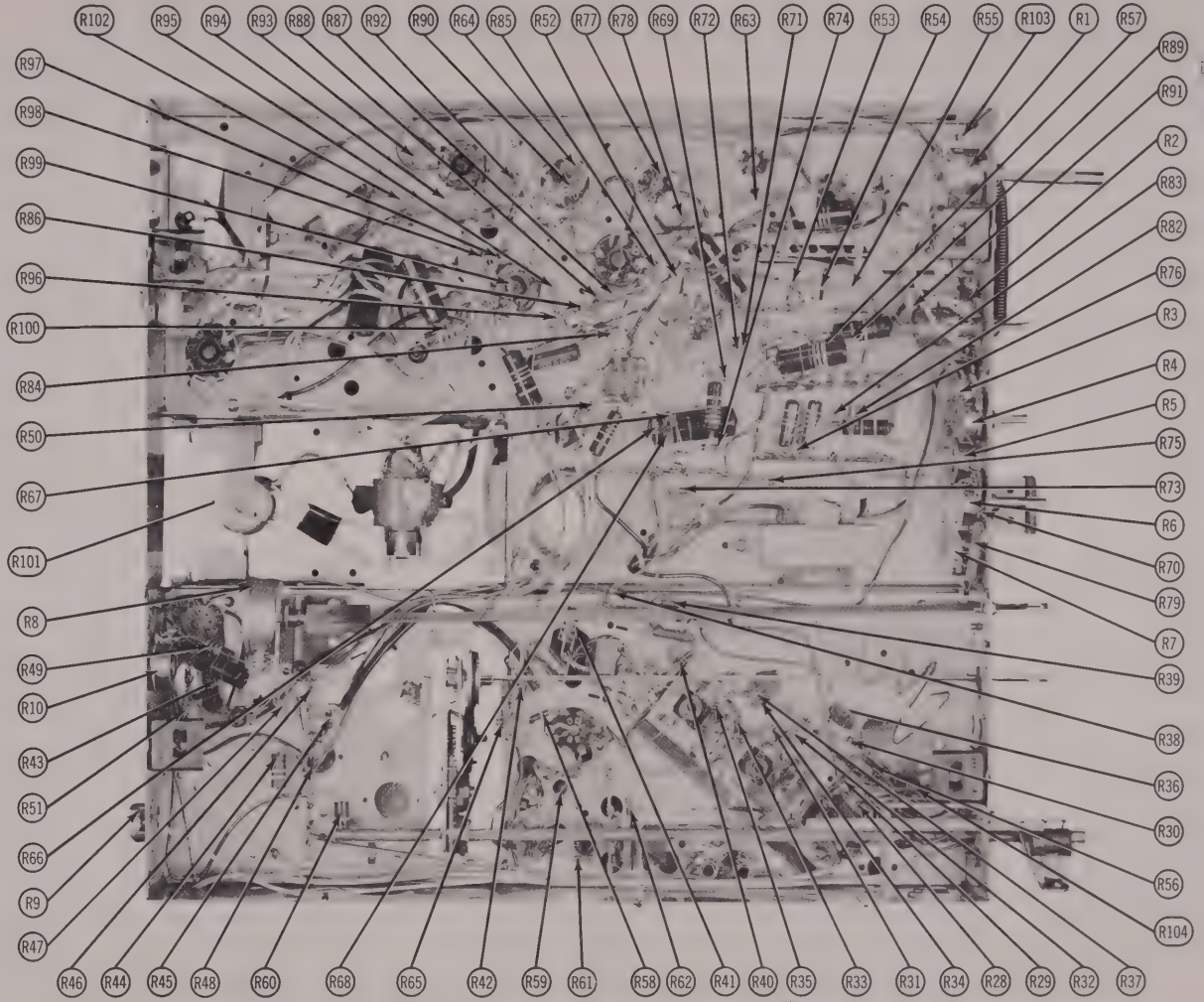
POWER

DEAD SET

If filaments fail to light, check AC interlock assembly. Check switch on volume control and T1. If filaments light, substitute V18. Check B+ filter and decoupling network.

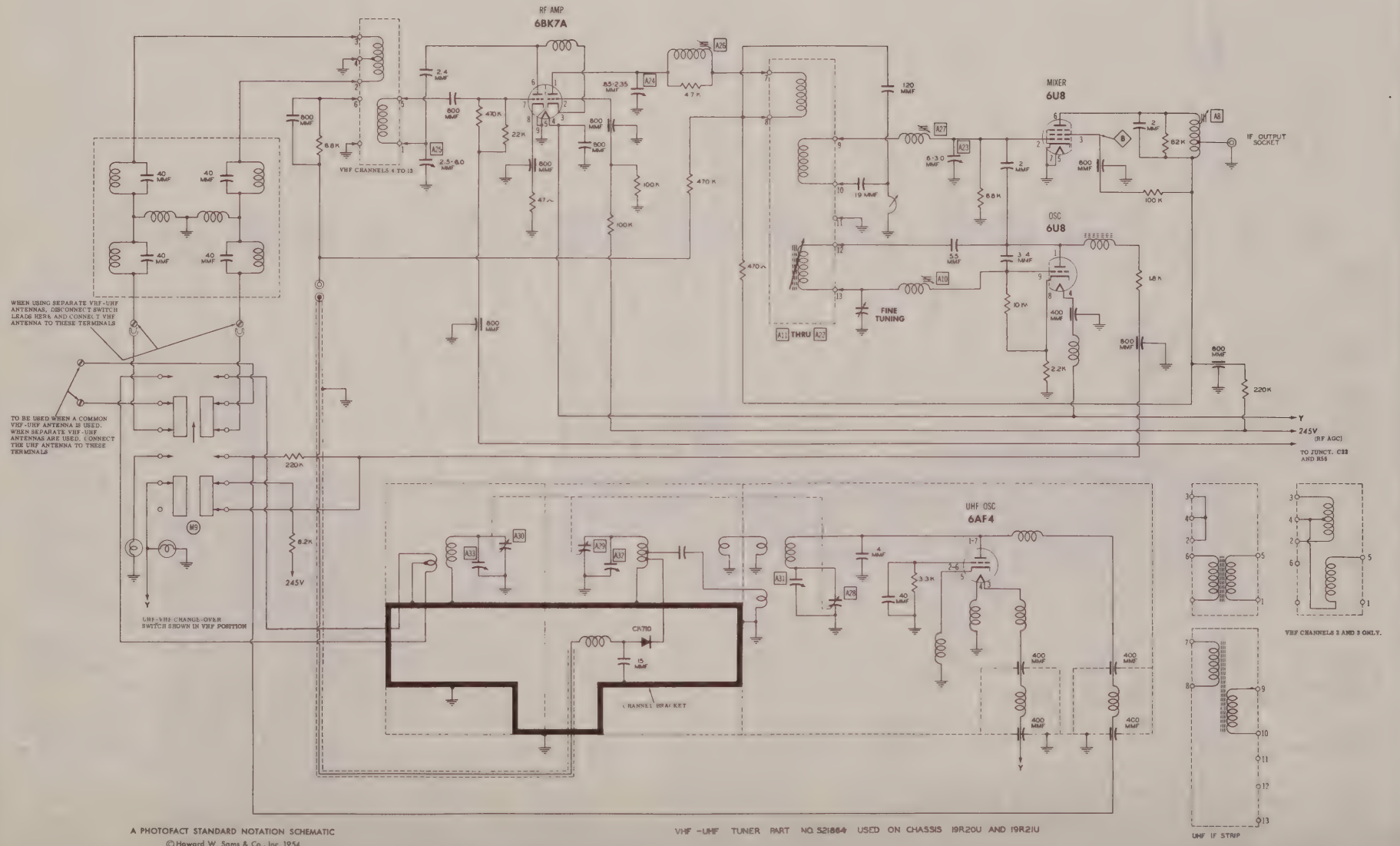
SMALL AND/OR DIM PICTURE

Substitute V18. Check B+ filter and decoupling network.



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

ZENITH MODELS R1800 E, EU, R, RU, R1813E EU, R, RU (Ch. 19820, U), R22229E EU, R, RU, R2230E, EU, R, RU, R2249E, EU, R, RU, R2250E, EU, R, RU, R2253M, MU, R2257E, EU, R, RU, R2258E, EU, R, RU (Ch. 19821, U)


RF AMP
6BK7A
MIXER
6U8
OSC
6U8
UHF OSC
6AF4
IF OUTPUT SOCKET
VHF CHANNELS 4 TO 13
FINE TUNING
THRU
WHEN USING SEPARATE VHF-UHF ANTENNAS, DISCONNECT SWITCH LEADS HERE AND CONNECT VHF ANTENNA TO THESE TERMINALS
TO BE USED WHEN A COMMON VHF-UHF ANTENNA IS USED. WHEN SEPARATE VHF-UHF ANTENNAS ARE USED, CONNECT THE UHF ANTENNA TO THESE TERMINALS
UHF-VHF CHANGE-OVER SWITCH SHOWN IN VHF POSITION
CHANNEL BRACKET
245V
(RF AGC)
TO JUNCT. C22 AND R30
VHF CHANNELS 2 AND 3 ONLY.
UHF IF STRIP

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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VHF-UHF TUNER PART NO. S21864 USED ON CHASSIS 19R20U AND 19R21U

UHF-VHF ALTERNATE TUNER SCHEMATIC

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: ZENITH PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE
V1	RF Amp.	6BK7A	6BK7A	9AJ
V2	Mixer-Osc.	6U8	6U8	9AE
V3	1st Video IF Amp.	6CB6	6CB6	7CM
V4	2nd Video IF Amp.	6CB6	6CB6	7CM
V5	3rd Video IF Amp.	6CB6	6CB6	7CM
V6	Video Output	12BY7	12BY7	9BF
V7	AGC Keying-Vert. Mult.	12AX7	12AX7	9A
V8	Limiter	6AU6	6AU6	7BK
V9	Audio Det.	6BN6	6BN6	7DF
V10	Audio Output	6AQ5	6AQ5	7BZ
V11	Sync Sep.	6BE6	6BE6	7CH
V12	Vert. Mult-Vert. Output	12B4	12B4	9AG
V13	Horiz. AFC-Horiz. Phase Det.	6AQ7GT	6AQ7GT	8CK
V14	Horiz. Osc. - Horiz. Discharge	6SN7GTA *	6SN7GTA	8BD
V15	Horiz. Output	6BQ6GT †	6BQ6GT	6AM
V16	Damper	6AX4GT	6AX4GT	4CG
V17	HV Rectifier	1B3GT	1B3GT	3C
V18	LV Rectifier	5U4G ▲	5U4G	5T

* 6SN7GT used as alternate.
† 6BQ6GA and 6CU6 used as alternates.
▲ 5U4GA used as alternate.

924 MERRIMAC ST
DENVER, COLORADO

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: ZENITH PART No.	CBS-HYTRON PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V19	17LP4A ①	17LP4A ①	17LP4A ①	17LP4A ①	17LP4A ①	12L	① Aluminized
		17LP4		17LP4		12L	② Circuit changes necessary.
				17VP4		12L	
	21YP4A ①	21YP4A ①	21YP4A ①	21YP4A ①	21YP4A ①	12L	
		21YP4				12L	
				21AFP4 ②		12M	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	■40	400	22-2547	AFH3-46		C037		FP378	TVL-3792	
B	▲80	400		PRS25/25		BR202		TC26		
C	▲10	400							TVA-1205	
D	20	25								
C2A	▲4	350	22-2546	E3C503						
B	100	50								
C	■10	475								
C3	800		22-2331	BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	
C4	800		22-2577							
C5	800		22-2577							
C6	800		22-2331	BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	
C7	2.4		22-2596							
C8	2.5-6		22-2221							
C9	800		22-2577							
C10	.85-2.3		22-2453							
C11	800		22-2577							
C12	120		22-2591	BPD-121	D6-121	G044	811-121	UC-5312	5GA-T12	
C13	19		22-2406							
C14	.6-3		22-2504							
C15	2		22-2434							
C16	5.5		22-2499							
C17	3.4		22-2502							
C18	800		22-2577							
C19	800		22-2577							
C20	2		22-2565							
C21	800		22-2577							
C22	10000		22-3	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C23	470		22-2214	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C24	8		22-2481			Z015				
C25	20		22-2593		TCZ-20	Z023	NP0K-200	ZT-542	5TCC-Q2	
C26	24		22-2515		TCZ-24	Z025	NP0L-240			
C27	24		22-2515		TCZ-24	Z025	NP0K-240			
C28	45		22-2600							
C29	.15	200	22-2147	P288-15		CUB2P15		PT4015	2TM-P15	
C30	330		22-2309	SI330	D6-331	TP43	GP2K-331	UC-5333	5GA-T33	
C31	1000		22-7	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C32	1000		22-7	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C33	1000		22-7	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C34	470		①							
C35	470		22-2302	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C36	470	500	22-2524	1468-471	D6-471	5W5T47	GP2K-471	UC-5347	5GA-T47	
C37	470		22-2214	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C38	1000		22-2112	SI1000	D6-102	TP52	GP2L-102	UC-521	5HK-D1	
C39	4.5		22-2522							
C40	7		22-2375							
C41	.022	200	22-1781	P488-022	DF-203	CUB4S22	817-02	PT4122	4TM-S22	
C42	47		22-2467	SI47NP0	TCZ-47	TZ22	NP0K-470	ZT-5447	5TCC-Q47	
C43	.1	200	22-1777	P288-1	DF-104	CUB2P1		PT401	2TM-P1	
C44	10000		22-3	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C45A	1000		22-2545	BPD-2X001	DD2-102	DK069	812-001	DCD-521	5HK-2D1	
B	1000									
C46	3.3		22-2343	SI3.3NP0	TCZ-3.3	TZ06	NP0A-3R3	ZT-5533	5TCCB-V33	
C47	50		22-2400	SI50	D6-500	TP30	GP1K-500	UC-545	5GA-Q5	
C48A	1000		22-2553	BPD-2X001	DD2-102	DK069	812-001	DCD-521	5HK-2D1	
B	1000									
C49	10000		22-3	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C50	10		22-2378							
C51	10000		22-3	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C52	.0068	600	22-2495	P688-0068	D6-682	CUB6D68	GP2-333-682	PT6268	6TM-D68	
C53	.0033	400	22-2631	P688-0033	D6-332	CUB6D33	GP2-333-332	PT6233	6TM-D33	
C54	27		22-2396	SI27NP0	TCZ-27	TZ16	NP0K-270		5TCC-Q27	
C55	.0033	400	22-1780	P688-0033	D6-332	CUB6D33	GP2-333-332	PT6233	6TM-D33	
C56	.033	600	②	P688-033		CUB6S3		PT6133	6TM-S3	
C57	.33	200	22-2159			PM4P33				
C58	.015	200	22-1850	P288-015		CUB6S15		PT6115	6TM-S15	
C59	2200		22-2623	1464-222		IR5D22		MCB460	MS-22	

ZENITH MODELS R1800, E, EU, R, RU, R1812E, EU, R, RU (Ch. 19R20, U), R2229E, EU, R, RU, R2230E, EU, R, RU, R2249E, EU, R, RU, R2250E, EU, R, RU, R2253M, MU, R2257E, EU, R, RU, R2258E, EU, R, RU (Ch. 19R21, U)

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C60	.0022	400	22-2161	1464-222		IR5D22		MCB460	MS-22	
C61	.1	400	22-2061	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C62	.0047	600	22-1849	1464-472		IR5D47		MCB465	MS-25	
C63	.047	200	22-1778	P288-047	DF-503	CUB2S47		PT4147	2TM-S47	
C64	.01	400	22-1846	P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C65	100		22-9	BPD-101	D6-101	G042	801-101	UC-531	5GA-T1	
C66	120	500	22-2505	1469-121	TCZ-120	22R5T12	NP0-333-121	MCB236	5TCC-T12	
C67	.001	200	22-1839	P688-001	D6-102	CUB6D1	GP2L-102	PT621	6TM-D1	
C68	4700		22-2624	BPD-0047	DD-502	K079	811-005	DC-525	5HK-D47	
C69	.15	200	22-2166	P288-15		CUB2P15		PT4015	2TM-P15	
C70	1000		22-2625	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C71	.1	200	22-1777	P288-1	DF-104	CUB2P1		PT401	2TM-P1	
C72	680	500	22-2125	1479-681		5R5T68			MS-37	
C73	1500		22-2626	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C74	1000	500	22-2163	1464-001		IR5D1		MCB255	MS-21	
C75	1000		22-2598	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C76	680		22-2387	SI680	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	
C77	220		22-2458	SI220	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	
C78	.047	400	22-1775	P488-047	DF-503	CUB4S47		PT4147	4TM-S47	
C79	75	2000	22-2628	HVD20-750	DD30-750				20GA-Q75	
C80	.15	400	22-2281	P488-15		CUB4P15		PT4015	4TM-P15	
C81	.1	400	22-1841 ①	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C82	72	2000								

① Not used in all versions.
② Some versions use .047MFD in this application (part #22-2634).

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA ZENITH PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1Meg	½	63-3199	A13-137	A47-1Meg-Z	AB-70	U-53	Volume - Note 1
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWE-12	KB-1	US-26	Attach to R1A
R2A	7.5Meg	½	63-2919	Q11-142	A47-7.5Meg-S	AB-98	U-82	Focus
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1	Not Req.	Attach to R2A
R3A	10Meg with 1Meg stop.	½	63-2946	Q11-143	A47-10Meg-S	AB-98	U-82	Height - Note 2
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1	Not Req.	Attach to R3A
R4A	200KΩ	½	63-2837	Q11-129	A47-200K-S	AB-46	U-43	Brightness
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R4A
R5A	15KΩ	½	63-2976	Q11-119	A47-15K-S	AB-20	U-26	AGC
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1	Not Req.	Attach to R5A
R6A	75KΩ	½	63-3222	Q11-125	A47-75K-S	AB-35	U-41	Vert. Hold
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R6A
R7A	2500Ω	½	63-2971	Q11-112	A47-3000-S	AB-7	SU-8	Vert. Linearity
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1	Not Req.	Attach to R7A
R8A	5000Ω	4	63-3201		A10-5000	SVP-999	M5MPK	Contrast Wire Wound
B	Shaft		Not Req.		FS-2	Not Req.	Not Req.	Attach to R8A
R9	600Ω	1	63-3167		39-600			Buzz Wire Wound
R10A	5Meg	½	63-3208	Q11-141	A47-5Meg-S	AB-87	SU-67	Fringe Lock
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R10A

Note 1: Chassis 19R22 used an alternate 1Meg control part no. 63-3229.
Note 2: Connect a 1Meg resistor in series with the left hand terminal of the control and the lead connecting to the same terminal of the original control. (Control viewed from shaft end, terminals down.)

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA ZENITH PART No.	IRC PART No.	NOTES
R11	56KΩ	½		BTS-56K	Note 1
R12	47KΩ	½	63-1856	BTS-47K	Note 1
R13	470KΩ	½	63-1897	BTS-470K	
R14	22KΩ	½	63-1841	BTS-22K	
R15	47Ω	1	63-1729	BTA-47	
R16	100KΩ	½	63-1869	BTS-100K	
R17	4700Ω	½	63-1813	BTS-4700	
R18	22KΩ	½	63-1842	BTS-22K	
R19	100KΩ	½	63-1869	BTS-100K	
R20	470Ω	½	63-1772	BTS-470	
R21	220Ω	½	63-1758	BTS-220	
R22	68KΩ	½	63-1862	BTS-68K	
R23	100KΩ	½	63-1869	BTS-100K	
R24	82KΩ	½	63-1866	BTS-82K	
R25	10KΩ	½	63-1828	BTS-10K	
R26	2200Ω	½	63-1800	BTS-2200	
R27	10KΩ	2	63-3170	BTB-10K	
R28	68Ω	½	63-1737	BTS-68	
R29	56Ω	½	63-1733	BTS-56	
R30	180Ω	½	63-1754	BTS-180	
R31	470Ω	½	63-1772	BTS-470	
R32	27KΩ	½	63-1845	BTS-27K	
R33	15Ω	½	63-1708	BTS-15	
R34	6800Ω	½	63-1821	BTS-6800	
R35	12KΩ	½	63-1831	BTS-12K	
R36	120KΩ	½	63-1873	BTS-120K	
R37	120KΩ	½	63-1873	BTS-120K	
R38	470Ω	½	63-1772	BTS-470	
R39	270Ω 5%	½	63-1780	BTS-270 5%	
R40	120Ω	½	63-1747	BTS-120	
R41	5600Ω	2	63-3223	BTB-5600	
R42	15KΩ	½	63-1834	BTS-15K	
R43	15Ω	½	63-1708	BTS-15	
R44	22KΩ	2	63-1566	BTB-22K	
R45	100KΩ	½	63-1869	BTS-100K	
R46	100KΩ	½	63-1869	BTS-100K	
R47	33KΩ	½	63-1848	BTS-33K	
R48	47KΩ	½	63-1855	BTS-47K	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA ZENITH PART No.	IRC PART No.	NOTES
R49	680Ω	1	63-2290	BTA-680	
R50	10Meg	½	63-1953	BTS-10Meg	
R51	220KΩ	½	63-1884	BTS-220K	
R52	3900Ω	½	63-1810	BTS-3900	
R53	680KΩ	½	63-1904	BTS-680K	
R54	220KΩ	½	63-1884	BTS-220K	
R55	220KΩ	½	63-1884	BTS-220K	
R56	2.2Meg	½	63-1926	BTS-2.2Meg	
R57	180KΩ	1	63-2313	BTA-180K	
R58	100KΩ	½	63-1870	BTS-100K	
R59	10KΩ	½	63-1827	BTS-10K	
R60	22KΩ	2	63-2141	BTB-22K	
R61	680Ω	½	63-1779	BTS-680	
R62	680KΩ	½	63-1904	BTS-680K	
R63	680Ω	1	63-2290	BTA-680	
R64	470Ω	½	63-1771	BTS-470	
R65	470KΩ	½	63-1897	BTS-470K	
R66	470KΩ	½	63-1897	BTS-470K	
R67	100KΩ	½	63-1869	BTS-100K	
R68	33KΩ	½	63-1848	BTS-33K	
R69	220KΩ	½	63-1883	BTS-220K	
R70	10KΩ	½	63-1828	BTS-10K	
R71	470KΩ	½	63-1898	BTS-470K	
R72	15KΩ	½		BTS-15K	Note 2
R73	4.7Meg	½	63-1940	BTS-4.7Meg	
R74	100KΩ	½	63-1869	BTS-100K	
R75	39KΩ	½	63-1852	BTS-39K	
R76	39KΩ	½	63-1852	BTS-39K	
R77	220Ω	½	63-1758	BTS-220	
R78	2.2Meg	½	63-1926	BTS-2.2Meg	
R79	1500Ω	2	63-2294	BTB-1500	
R80	560Ω	½	63-1775	BTS-560	
R81	560Ω	½	63-1775	BTS-560	
R82	470KΩ	½	63-1898	BTS-470K	
R83	100KΩ	½	63-1870	BTS-100K	
R84	1Meg	½	63-1911	BTS-1Meg	
R85	1Meg	½	63-1911	BTS-1Meg	
R86	1Meg	½	63-1911	BTS-1Meg	

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924 MEADE ST
VER, COLORADO

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (cont)

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ZENITH PART No.	IRC PART No.	
R87	27KΩ	½	63-1845	BTS-27K	
R88	100Ω	½	63-1744	BTS-100	
R90	470Ω	½	63-1771	BTS-470	
R90	47KΩ	1	63-1194	BTA-47K	
R91	10KΩ	2	63-2145	BTB-10K	
R92	22KΩ	½	63-1842	BTS-22K	
R93	47KΩ	½	63-1856	BTS-47K	
R94	180KΩ	1	63-2313	BTA-180K	
R95	2700Ω	½		BTS-2700	Note 3

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ZENITH PART No.	IRC PART No.	
R96	2700Ω	½		BTS-2700	Note 1
R97	100Ω	½	63-1744	BTS-100	
R98	470KΩ	½	63-1898	BTS-470K	
R99	100Ω	½	63-1744	BTS-100	
R100	8200Ω	2	63-1091	BTB-8200	Note 4
R101	3.3Ω	½	63-2769		
R102	33KΩ	½	63-1849	BTS-33K	
R103	100KΩ	½	63-1870	BTS-100K	
R104	8.2Ω	2			Note 1

Note 1: Not used in some versions.
Note 2: Some versions may use a 10KΩ resistor in this application.
Note 3: Some versions may use a 47KΩ resistor in this application.
Note 4: Some versions may use a 12KΩ 2 watt resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	ZENITH PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @ 1.56A	524VCT .250ADC	5VAC @ 3A	95-1375						
	SEC. 3	SEC. 4	SEC. 5							
	12.6VCT @ 4.4A									

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA							
		ZENITH PART No.	Halldorson PART No.	Merit PART No.	RCA PART No.	Ram PART No.	Stancor TYPE No.	Thordarson PART No.	Triad PART No.
T2	Horiz. Output Trans.	S-22154 ④							
T3	Vert. Output Trans.	95-1421	Z1803 ①	A-3037 ①		V307 ① ②	A-8113 ①	26S51 ①	A-108X ① ②
T4	Yoke-Horiz. (12MH) Vert. (41MH)	95-1413	DF602 ③	MDF-72 ③	21ID2 ③	Y70F12 ③	DY-9A ③	Y-7 ③	Y-17-1 ③

① Connect as auto transformer.
② Drill one new mounting hole.
③ Use original rear cover and positioning device.
④ Includes tertiary winding and terminal assembly part no. S-21264; winding and terminal assembly part no. S-22205.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	ZENITH PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T5	6KΩ	3.3Ω	95-1339	A-3877	A-3020	S-5Z	Z1003	26S49	

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	ZENITH PART No.	VIKING PART No.	QUAM PART No.	
SP1	4"	PM	3.3Ω	49-750	4J6	4A07	① Used in console models.
	10"	PM	3.3Ω	49-752 ①	10J11	10A31	
	10"	PM	3.3Ω	49-765 ①	10J11	10A31	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	ZENITH PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1A	Ant. Coil	0ΩCT	0Ω	S-21712				Channel 2
B	Ant. Coil	0ΩCT	0Ω	S-21713				Channel 3
C	Ant. Coil	0ΩCT	0Ω	S-21714				Channel 4
D	Ant. Coil	0ΩCT	0Ω	S-21715				Channel 5
E	Ant. Coil	0ΩCT	0Ω	S-21716				Channel 6
F	Ant. Coil	0ΩCT	0Ω	S-19847				Channel 7
G	Ant. Coil	0ΩCT	0Ω	S-19848				Channel 8
H	Ant. Coil	0ΩCT	0Ω	S-19849				Channel 9
I	Ant. Coil	0ΩCT	0Ω	S-19850				Channel 10
J	Ant. Coil	0ΩCT	0Ω	S-19851				Channel 11
K	Ant. Coil	0ΩCT	0Ω	S-19852				Channel 12
L	Ant. Coil	0ΩCT	0Ω	S-19853				Channel 13
L2	Neut. Coil	0Ω		20-431				
L3	RF Coil	0Ω		20-537				
L4A	RF, Mixer Grid & Osc. Coils	0Ω		S-21702				Channel 2
B	RF, Mixer Grid & Osc. Coils	0Ω		S-21703				Channel 3
C	RF, Mixer Grid & Osc. Coils	0Ω		S-19864				Channel 4
D	RF, Mixer Grid & Osc. Coils	0Ω		S-19865				Channel 5
E	RF, Mixer Grid & Osc. Coils	0Ω		S-19866				Channel 6
F	RF, Mixer Grid & Osc. Coils	0Ω		S-19867				Channel 7
G	RF, Mixer Grid & Osc. Coils	0Ω		S-19868				Channel 8

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (cont)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA ZENITH PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
H	RF, Mixer Grid & Osc. Coils	0Ω		S-19869				Channel 9
I	RF, Mixer Grid & Osc. Coils	0Ω		S-19870				Channel 10
J	RF, Mixer Grid & Osc. Coils	0Ω		S-19871				Channel 11
K	RF, Mixer Grid & Osc. Coils	0Ω		S-19872				Channel 12
L	RF, Mixer Grid & Osc. Coils	0Ω		S-19873				Channel 13
L5	Mixer Grid Coil	0Ω		20-538				
L6	Mixer Grid Coil	0Ω		126-764				
L7	Fil. Choke	0Ω		20-391				
L8	Osc. Trimmer Coil	0Ω		20-541				
L9	IF Coil	.4Ω		S-18859				
L10	Conv. Plate	.3Ω		S-20902				Tapped at .1Ω
L11	1st Video IF	.1Ω		S-21019			6232	Includes 41.25MC trap
L12	47.25MC trap	0Ω		S-21718	17-4502■		6226	
L13	39.75MC trap	0Ω		S-21719	17-4501■		6226	
L14	2nd Video IF	.1Ω	.1Ω	S-17907			6232▲	
L15	3rd Video IF	.1Ω	.1Ω	S-19952			6233▲	
L16	4th Video IF	.2Ω	.2Ω	S-20623				
L17	Series Peaking Coil	5.5Ω		S-17912	19-3093	TV-181	6177	95 Microhenries
L18	Shunt Peaking Coil	5.5Ω		S-21562	19-3160▲	TV-184▲	4644▲	160 Microhenries; Wound on 2700Ω resistor in series
L19	Series Peaking Coil	.9Ω		S-21888	19-1004		4610	6.7 Microhenries
L20	4.5MC trap	12.5Ω	1.3Ω	S-21492				
L21	Series Peaking Coil	5Ω		S-21563	19-3125♦		6153♦	136 Microhenries; Wound on 5600Ω resistor
L22	Sound IF	.3Ω	.3Ω	S-20219	16-3445			
L23	Quadrature Coil	4.6Ω		S-19020	20-1004†	TV-151†	1470T	
L24	Horiz. Osc.	148Ω*		S-19743	19-1577			
L25	RF Choke	.1Ω		20-528				5.5 Microhenries
L26	RF Choke	.1Ω		20-528				5.5 Microhenries

* Tapped at 75Ω
■ Use trap winding only.
▲ Detune trap.
▲ Series with a 5.6KΩ resistor.
♦ Parallel with 5.6KΩ resistor.
† Drill mounting hole.

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D. C. RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ∿)	REPLACEMENT DATA ZENITH PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
L27	.250A	66Ω	1.7HY	95-1376 95-1379 ②	C-2326①	C-2996 ①	C-23X	C5037 ①	26C44

① Drill one new mounting hole.
② Alternate filter choke.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA ZENITH PART No. FUSE	ZENITH PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG-S/B	2/10A 125V	136-23	83-1883	313.200 (3AG-S/B 2/10A)	357001	MDL 2/10	4405

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA ZENITH PART No.	FEDERAL PART No.	SYLVANIA PART No.	NOTES
M2	CK706A	103-1	1N64A	1N60 or 1N132	Video Det.

MISCELLANEOUS

ITEM No.	PART NAME	ZENITH PART No.	NOTES
M3	Pilot Light	100-67	#GE-RR12 - Not used in all versions
M4	Pilot Light	100-67	Chassis 19R20U, 19R21U, 19R22U
M5A	Tuner	S21735	VHF-UHF (usedUHF strips), Chassis 19R20 & 19R21
B	Tuner	S21700	VHF only - Chassis 19R20U & 19R21U
M6	Tuner	S21864	UHF - Chassis 19R20U, 19R21U & 19R22U
M7	Trap		VHF Ant. Input Filter
M8	Video Detector Assy.	S-21686	Includes M2, C39, C40, L17, L18, L19
M9	Switch	85-546	VHF-UHF Changeover - Chassis 19R20U, 19R21U & 19R22U
M10	Centering Device	S-19898	Includes yoke cover
M11	Ion Trap	S-17164	
M12	Width Control	199-193	

PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS (cont)

ITEM No.	PART NAME	ZENITH PART No.	NOTES
M13	Integrator	87-1	Vertical
B1	Trimmer Cap.	22-2398	Horiz. Drive
	Cabinet	14-1648E	Models R1800E, R1800EU
	Cabinet	14-1648R	Models R1800R, R1800RU
	Cabinet	14-1742E	Models R1812E, R1812EU
	Cabinet	14-1742R	Models R1812R, R1812RU
	Cabinet	14-1729	Models R2229R, R2229RU
	Cabinet	14-1730	Models R2229E, R2229EU
	Cabinet	14-1731	Models R2230R, R2230RU
	Cabinet	14-1732	Models R2230E, R2230EU
	Cabinet	14-1750	Models R2249R, R2249RU
	Cabinet	14-1751	Models R2249E, R2249EU
	Cabinet	14-1741E	Models R2250E, R2250EU
	Cabinet	14-1741R	Models R2250R, R2250RU
	Cabinet	14-1740E	Models R2258E, R2258EU
	Cabinet	14-1740R	Models R2258R, R2258RU
	Cabinet	14-1764M	Models R2253M, R2253MU
	Cabinet	14-1773E	Models R2257E, R2257EU
	Cabinet	14-1773R	Models R2257R, R2257RU
	Knob	46-1051	Fine tuning - Models R1800E, R, R1812E, R, R1800EU, RU, R1812EU, RU, R2250E, R, R2258E, R, R2250RU, EU, R2258EU, RU, R2253M, R2253MU
	Knob	46-1052	Fine tuning - Models R2229E, R, R2230E, R, R2249E, R, R2229RU, EU, R2230RU, EU, R2249EU, RU
	Knob	46-1355	Fine tuning - Models R2257E, R, EU, RU
	Knob	46-1117	Horiz. Hold - Models R1800E, R, R1812E, R, R1800EU, RU, R1812EU, RU, R2250E, R, R2258E, R, R2250RU, EU, R2258EU, RU, R2253M, R2253MU
	Knob	46-1118	Horiz. Hold - Models R2229E, R, R2230E, R, R2249E, R, R2229RU, EU, R2230RU, EU, R2249EU, RU, R2257E, R, EU, RU
	Knob	46-1181	Brightness - Vert. Hold - Models R1800E, R, R1812E, R, R1800EU, RU, R1812EU, RU, R2250E, R, R2258E, R, R2250RU, EU, R2258EU, RU, R2253M, R2253MU
	Knob	46-1182	Brightness - Models R2229E, R, R2230E, R, R2249E, R, R2229RU, EU, R2230RU, EU, R2249EU, RU, R2257E, R, EU, RU
	Knob	46-1198	Contrast - Models R1800E, R, R1812E, R, R1800EU, RU, R1812EU, RU, R2250E, R, R2258E, R, R2250RU, EU, R2258EU, RU R2253M, MU
	Knob	46-1199	Contrast - Models R2229E, R, R2230E, R, R2249E, R, R2229RU, EU, R2230RU, EU, R2249EU, RU, R2257E, R, EU, RU
	Knob	46-1243	On-off-volume- Models R1800E, R, R1800EU, RU
	Knob	46-1297	On-off-volume - Model R1812R
	Knob	46-1298	On-off-volume - Model R1812E
	Knob	46-1159	On-Off-volume - Model R1812RU
	Knob	46-1160	On-off-volume - Model R1812EU
	Knob	46-1304	On-off-volume - Models R2229R, R2250R, R2229RU, R2250RU
	Knob	46-1305	On-off-volume - Models R2229E, R2250E, R2229EU, R2250EU
	Knob	46-1197	On-off-volume - Models R2230E, R2249E, R2258E
	Knob	46-1196	On-off-volume- Models R2230R, R2249R, R2258R, R2253M
	Knob	46-1133	On-off-volume - Models R2230RU, R2249RU, R2258RU, R2253MU
	Knob	S-21308	Channel Selector Assy.- Models R1800E, R, R2229R, R2250R
	Knob	S-21304	Channel Selector Assy.- Models R1812R, R2230R, R2249R, R2258R, R2253M
	Knob	S-21583	Channel Selector Assy. - Models R2230E, R1812E, R2249E, R2258E
	Knob	S-21477	Channel Selector Assy. - Models R1800E, EU, R2229R, R2250R
	Knob	S-21454	Channel Selector Assy. - Models R1812RU, R2230RU, R2249RU, R2258RU, R2253MU
	Knob	S-21455	Channel Selector Assy. - Models R1812EU, R2230EU, R2249EU, R2258EU
	Knob	S-21611	Channel Selector Assy. - Models R2229E, R2250E
	Knob	S-21487	Channel Selector Assy. - Models R2229EU, R2250EU
	Knob	S-21883	Channel Selector Assy. - Models R2257E, R, EU, RU
	Knob	S-21757	Tuning (UHF) Models R1800EU, RU, R1812EU, RU, R2229RU, EU, R2230RU, EU, R2250RU, RU, R2249EU, RU, R2258EU, RU, R2253MU
	Knob	S-22024	Tuning (UHF) Models R2257EU, RU
	Knob	S-22056	UHF Dial & Scale Assy. - Models R1800EU, RU, R1812EU, RU, R2229EU, RU, R2230EU, RU, R2250RU, EU, R2258EU, RU, R2253MU,
	Knob	S-22048	UHF Dial & Scale Assy. - Models R2257EU, RU
	Safety Glass	192-176	Models R1800E, R, R1800EU, RU
	Safety Glass	192-191 or 192-177	Models R1812E, R, R1812EU, RU
	Safety Glass	192-186	Models R2229E, R, R2230E, R, R2249E, R, R2229RU, EU, R2230RU, EU, R2249EU, RU
	Safety Glass	192-188	Models R2250E, R, R2258E, R, R2250RU, EU, R2258EU, RU, R2253MU
	Safety Glass	192-190	Models R2257E, R, EU, RU
	Mask	196-248	Models R2250E, R, R2258E, R, R2250RU, EU, R2258EU, RU, R2253MU
	Mask	196-253	Models R2257E, EU
	Mask	196-257	Models R2257R, RU

ZENITH MODELS R1800, E, EU, R, RU, R1812E, EU, R, RU (Ch. 19R20, U), R2229E, EU, R, RU, R2230E, EU, R, RU, R2249E, EU, R, RU, R2250E, EU, R, RU, R2253M, MU, R2257E, EU, R, RU, R2258E, EU, R, RU (Ch. 19R21, U)

TROUBLE SHOOTING AIDS (cont)

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V13, V14, V15, V16 and V17. Check M1 fuse. Check waveform W17.

If Satisfactory	If Unsatisfactory
Check T2, T4A, C79, C80, C78, R100, and other associated components.	Check C72, C73, C74, C75, C77, R90, R94, L24 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V14, V15, V16 and V18. Check T2, T4A, C77, C76, R100, R96 and R94. Check B+ filter and decoupling network.

BLOOMING

Check by substitution V14, V15, V16, V17 and V18. Check C77, R100 and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or No Sound".

RASTER, NO SOUND, NO PICTURE

Check by substitution V1, V2, V3, V4, V5 and V6. Check components associated with video IF stages.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set".

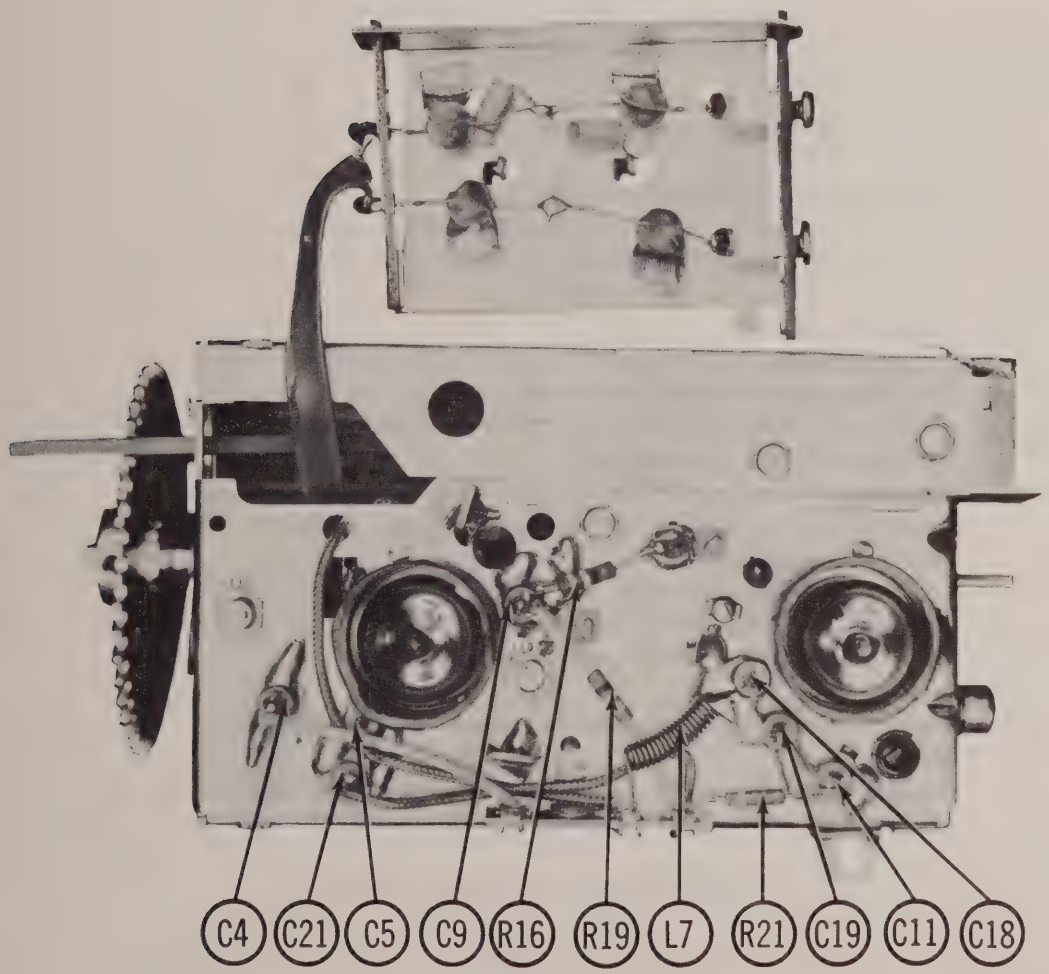
KEYSTONE EFFECT

Check T4 and its associated components.

INTERMITTENT STREAKS

Check the high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.



RF TUNER TOP VIEW

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

For touch-up adjustment of the VHF tuner oscillator circuit, it is necessary to remove rear cover and supply power to set. Adjustments are made thru the hole marked "Bull's Eye Adjustment" and are accessible one at a time as the selector switch is turned to each channel. (Fine tuning control must be set to the center of its range before making adjustments). Use alignment wrench 68-21 for adjustments.

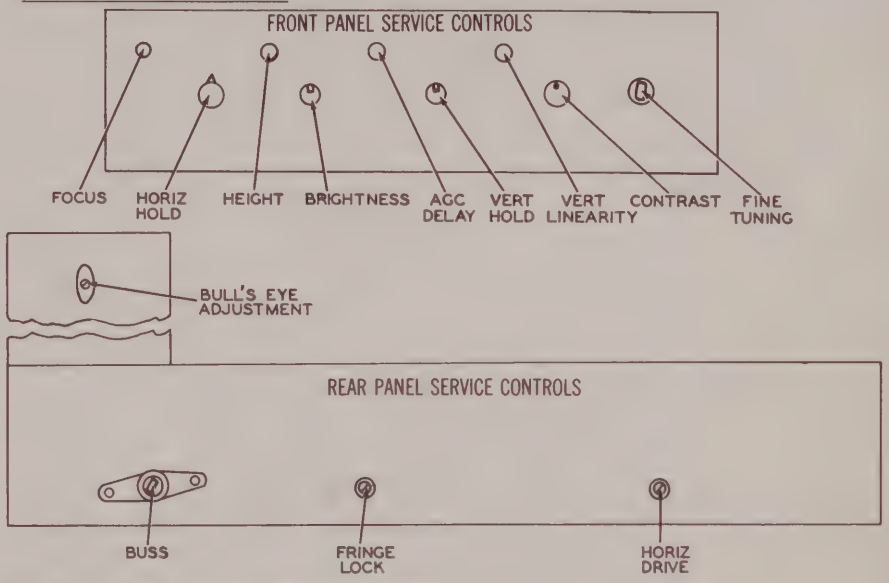
PICTURE TUBE SAFETY GLASS CLEANING

For picture tube safety glass cleaning, it is necessary to remove chassis. (See disassembly instructions).

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION



SPECIAL ADJUSTMENTS - AGC DELAY ADJUSTMENT

Turn the set on and tune in a TV signal and observe the picture. Starting from the full clockwise position turn the AGC delay control counter clockwise slowly until picture distorts and buzz is heard in the sound. Then turn control clockwise for clearest picture and best sound.

FRINGE LOCK ADJUSTMENT

Turn the fringe lock control to 1/4 turn from full clockwise position. Adjust the vertical and horizontal hold for picture synchronization and check stability by switching off channel and back again.

SLIGHTLY retouch the fringe lock control adjustment, if necessary, for maximum stability while testing as above.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit can be made from the front panel service control . Adjust the horizontal hold control (L24) until picture synchronizes horizontally. If results cannot be obtained see horizontal sweep circuit adjustments on Page 11

SOUND IF DETECTOR BUZZ ADJUSTMENT

Adjust the buzz control located on the rear apron of the chassis for maximum volume and minimum buzz. If results are unsatisfactory see alignment instructions on pages 6 and 7.

FUSES

One fuse is used for horizontal sweep circuit protection. (For location see tube placement chart).

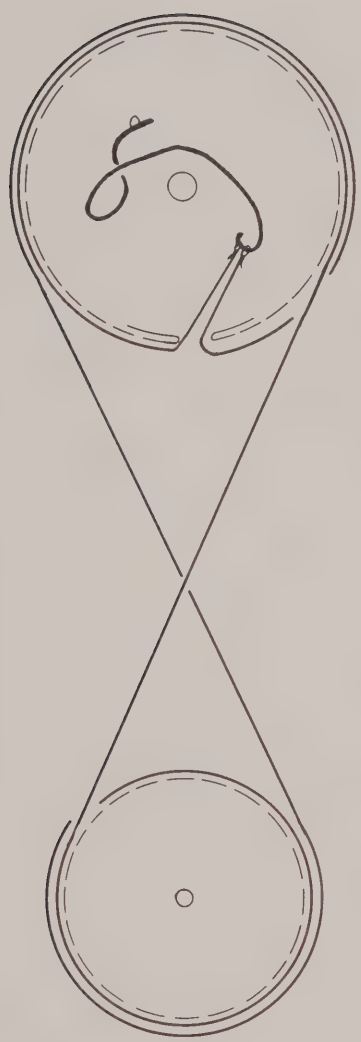
CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

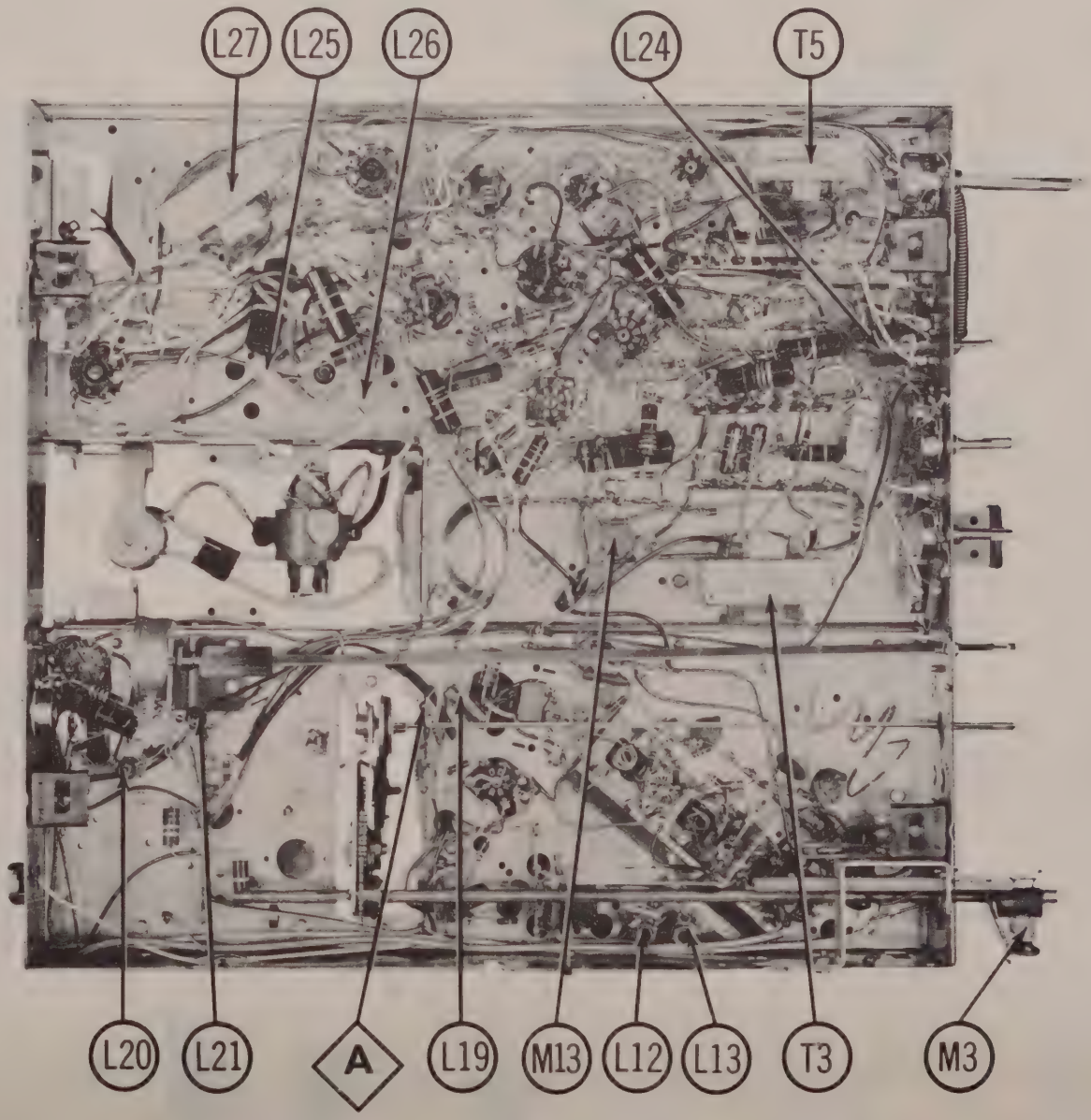
1. Remove 2 push-on type control knobs from front of cabinet, and 5 knobs from under front control door.
2. Remove 5 wood screws from rear cover . Remove rear cover.
3. Disconnect 2 speaker leads. Remove 2 speaker nuts. Remove speaker.
4. Remove 4 chassis bolts. Remove chassis.

PROPERTY OF
L. F. BLANK
3924 [illegible]
DENVER, COLORADO



FINE TUNING IN MAX. COUNTER CLOCKWISE POSITION.

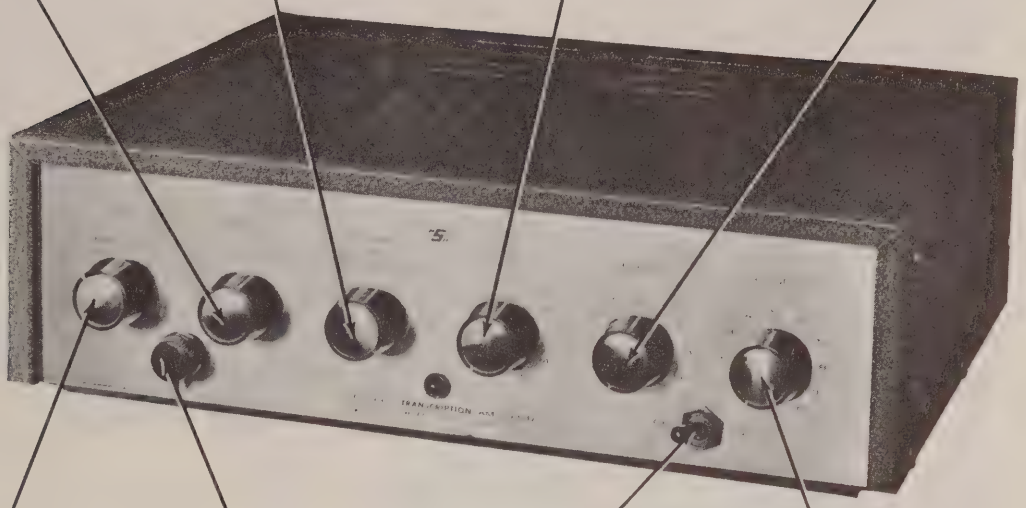
FINE TUNING DRIVE CORD STRINGING



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

L. F
DENVER, COLORADO

H. H. SCOTT MODEL 99-A
Replaces Folder 14-Set 257



H. H. SCOTT MODEL 99-A
Replaces Folder 14-Set 257

TRADE NAME	H.H. Scott Model 99-A
MANUFACTURER	Hermon H. Scott, Inc., 385 Putman Ave., Cambridge 39, Mass.
TYPE SET	AC Operated Equalizer-Pre-amplifier & 12 Watt Audio Amplifier
TUBES (Six)	Types 12AX7 Phono Pre-amp., 12AX7 Pre-Amp., 12AU7 AF Amp.-Phase Inverter, (2) 6V6GT Audio Output, 5Y3GT Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles

THIS FOLDER REPLACES FOLDER 14-SET 257.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		SCOTT PART No.	STANDARD REPLACEMENT		
V1	Phono Pre-Amp.	12AX7	12AX7	9A	
V2	AF Amplifier	12AX7	12AX7	9A	
V3	AF Amplifier-Phase Inverter	12AU7	12AU7	9A	
V4	Audio Output	6V6GT	6V6GT	7S	
V5	Audio Output	6V6GT	6V6GT	7S	
V6	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

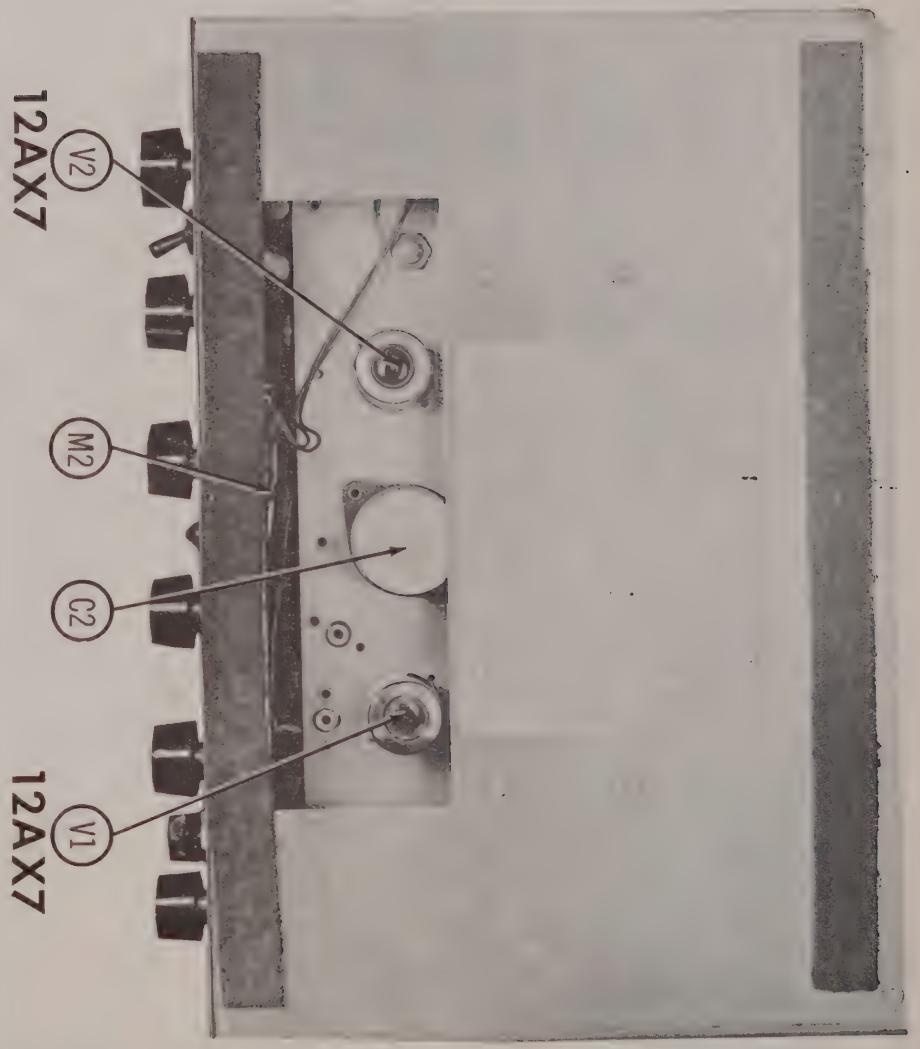
ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	SCOTT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	▲20	475				D013		FP444	R1084	
B	■20	475								
C	▲20	475								
D	20	475								
C2A	▲10	450		AFH4-63		D088		FP426		
B	■10	450								
C	▲25	25								
D	25	25								
C3	10	50		PRS50/10		BR105		TC32	TVA-1304	Note 1
C4	25	25		PRS25/25		BR252		TC26	TVA-1205	
C5	100	500		1468-0001		22R5T1		MC235	MS-31	
C6	180	500		1468-0002		22R5T18		MC237	MS-32	
C7	470	500		1468-0005		5R5T5		MC245	MS-35	
C8	.0015	400		P488-0015	D6-152	CUB4D15	GP2-333-152	PT4215	4TM-D15	
C9	680	500				1R5T68			MS-37	
C10	.022	400		P488-022		CUB4S22		PT4122	4TM-S22	
C11	.022	400		P488-022		CUB4S22		PT4122	4TM-S22	
C12	.047	400		P488-047	DF-503	CUB4S47		PT4147	4TM-S47	
C13	220	500		1468-0002		22R5T22		MC237	MS-32	
C14	33	500		1468-00003		22R5Q33		MC223	MS-33	
C15	.0022	400		P488-0022	D6-222	CUB4D22	GP2-333-222	PT4222	4TM-D22	
C16	.0022	400		P488-0022	D6-222	CUB4D22	GP2-333-222	PT4222	4TM-D22	
C17	.01	400		P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C18	100	500		1468-0001		22R5T1		MC235	MS-31	
C19	.0022	400		P488-0022	D6-222	CUB4D22	GP2-333-222	PT4222	4TM-D22	
C20	.001	600		P688-001	D6-102	CUB6D1	GP2L-102	PT621	6TM-D1	
C21	.01	400		P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C22	.01	400		P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C23	47	500		1468-00005		22R5Q47		MC225	MS-45	
C24	.01	400		P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C25	.022	400		P488-022		CUB4S22		PT4122	4TM-S22	
C26	470	500		1468-0005		5R5T47		MC245	MS-35	
C27	220	500		1468-0002		22R5T22		MC237	MS-32	
C28	.047	400		P488-047	DF-503	CUB4S47		PT4147	4TM-S47	
C29	.047	400		P488-047	DF-503	CUB4S47		PT4147	4TM-S47	

Note 1. Some models may use a 25MFD @ 25V in this application.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	SCOTT PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	500KΩ	½	RCV-500K-3	Q13-133	A47-500K-Z	B-60	U-48	Pickup level adj.
B	Shaft		Not Req.	Not Req.	RS-2	Not Req.	Not Req.	Attach to R1A
R2A	1Meg	½	RCV-1Meg-4	Q13-137	A47-1Meg-Z	B-70	U-53	Bass
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R2A
R3A	1Meg	½	RCV-1Meg-4	Q13-137	A47-1Meg-Z	B-70	U-53	Treble
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R3A
R4	500KΩ	½	RCV-500KTT-4F				UDT283	Loudness tapped @ 260K & 110KΩ
R5A	500KΩ	½	RCV-500-5	Q11-103	A47-500-S	AB-4		Hum Balance
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1		Attach to R5A
R6A	100KΩ	½	RCV-100K-2	Q11-128	A47-100K-S	AB-40	SU-41	Signal Balancing
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1	Not Req.	Attach to R6A

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	SCOTT PART No.	IRC PART No.	
R7	47KΩ	1/2		BTS-47K	
R8	15KΩ	1/2		BTS-15K	
R9	2700Ω	1/2		BTS-2700	
R10	270KΩ	1/2		BTS-270K	
R11	1Meg	1/2		BTS-1Meg	
R12	2700Ω	1/2		BTS-2700	
R13	270KΩ	1/2		BTS-270K	
R14	1Meg	1/2		BTS-1Meg	
R15	22Meg	1/2		BTS-22Meg	
R16	1.8Meg	1/2		BTS-1.8Meg	
R17	270KΩ	1/2		BTS-270K	
R18	47KΩ	1/2		BTS-47K	
R19	1Meg	1/2		BTS-1Meg	
R20	470KΩ	1/2		BTS-470K	
R21	2.2Meg	1/2		BTS-2.2Meg	
R22	3.3Meg	1/2		BTS-3.3Meg	
R23	2.2Meg	1/2		BTS-2.2Meg	
R24	1000Ω	1/2		BTS-1000	
R25	47KΩ	1		BTA-47K	
R26	220KΩ	1/2		BTS-220K	
R27	100KΩ	1/2		BTS-100K	
R28	22KΩ	1/2		BTS-22K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	SCOTT PART No.	IRC PART No.	
R29	1500Ω	1/2		BTS-1500	
R30	100KΩ	1		BTA-100K	
R31	15KΩ	1/2		BTS-15K	
R32	330KΩ	1/2		BTS-330K	
R33	47KΩ	1/2		BTS-47K	
R34	100KΩ	1/2		BTS-100K	
R35	470KΩ	1/2		BTS-470K	
R36	33KΩ	1/2		BTS-33K	
R37	2.7Ω	1			
R38	1500Ω	1/2		BTS-1500	
R39	15KΩ	1/2		BTS-15K	
R40	100KΩ	1		BTA-100K	
R41	1500Ω	1/2		BTS-1500	
R42	100KΩ	1		BTA-100K	
R43	47KΩ	1/2		BTS-47K	
R44	4700Ω	1/2		BTS-4700	
R45	250Ω	4		PW4-250	
R46	220KΩ	1/2		BTS-220K	
R47	470KΩ	1/2		BTS-470K	
R48	2.7Ω	1			
R49	470Ω	1/2		BTS-470	
R50	220Ω	2		BTB-220	

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	SCOTT PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @.75A	680VCT .095ADC	5VAC @ 2A	6.3VAC @2.4A		PM-8410①	P-2953 ①	R-14B ①	P9315①	24R05 ①

① Tape 6.3V center tap.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	SCOTT PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T2	10KΩ CT	500Ω tap@ 150Ω, 16Ω, 8Ω, 4Ω Sec. 2 55Ω Res.							150Ω tap not used

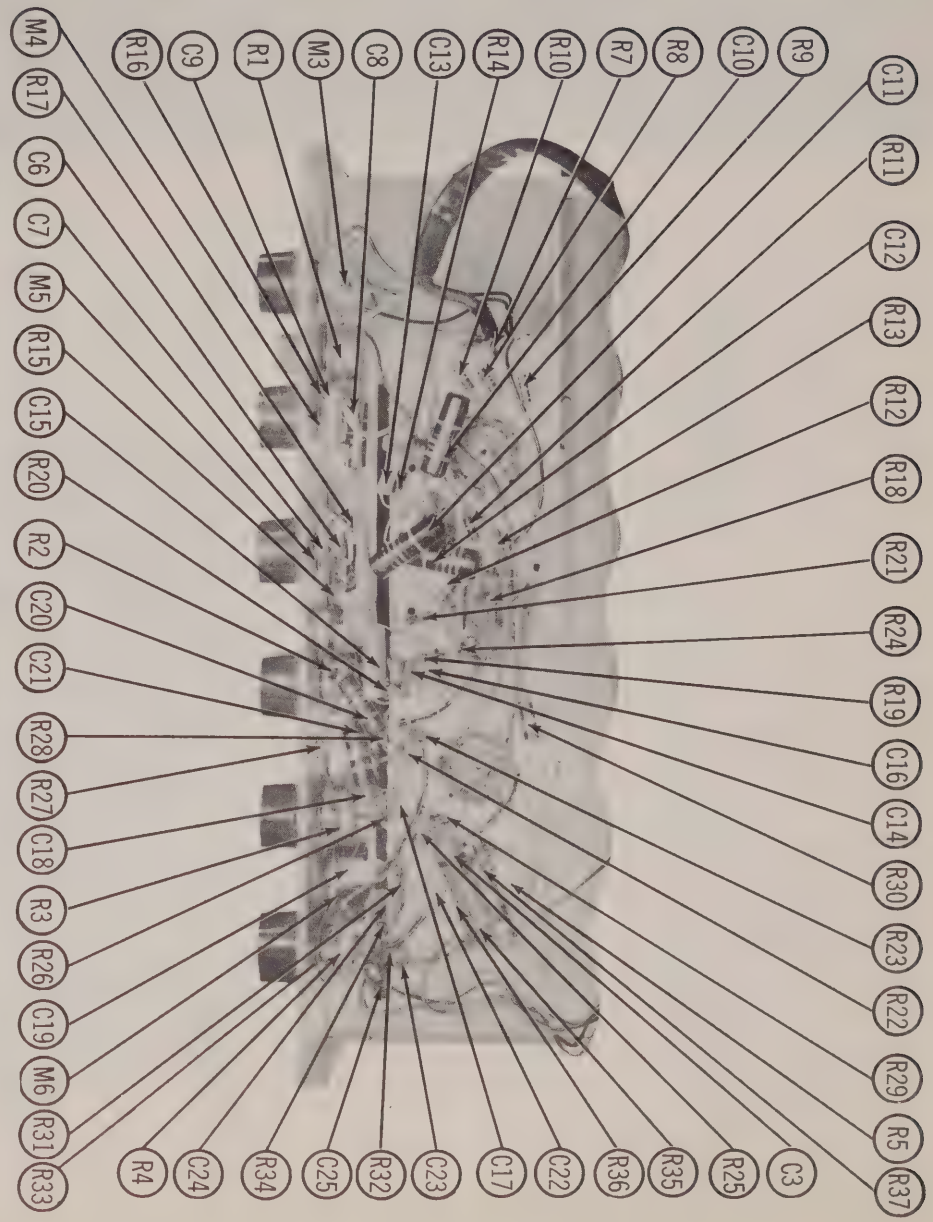
FUSES

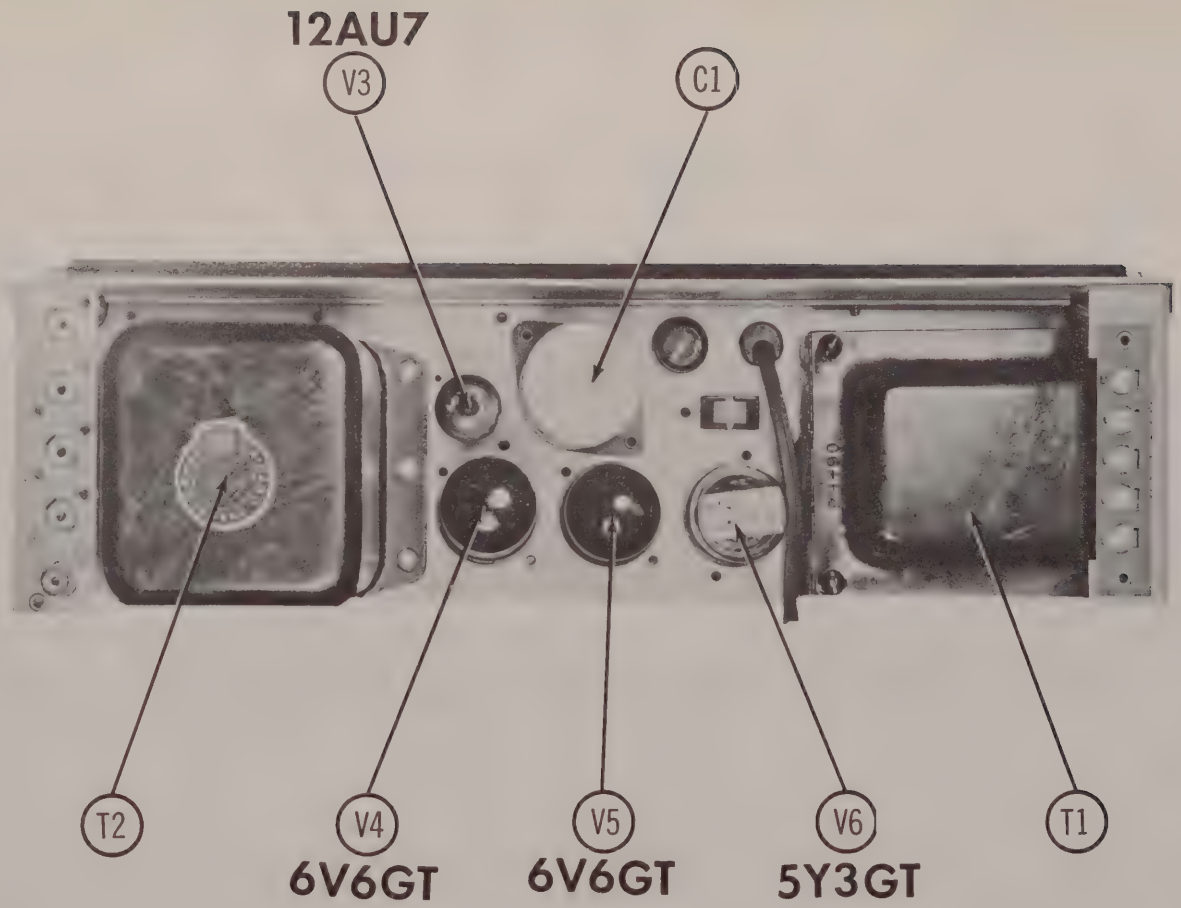
ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			SCOTT PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG S/B	1-1/4A			3131.25 (3AG S/B-1- 1/4A)	342001	MDL 1-1/4	HKP

MISCELLANEOUS

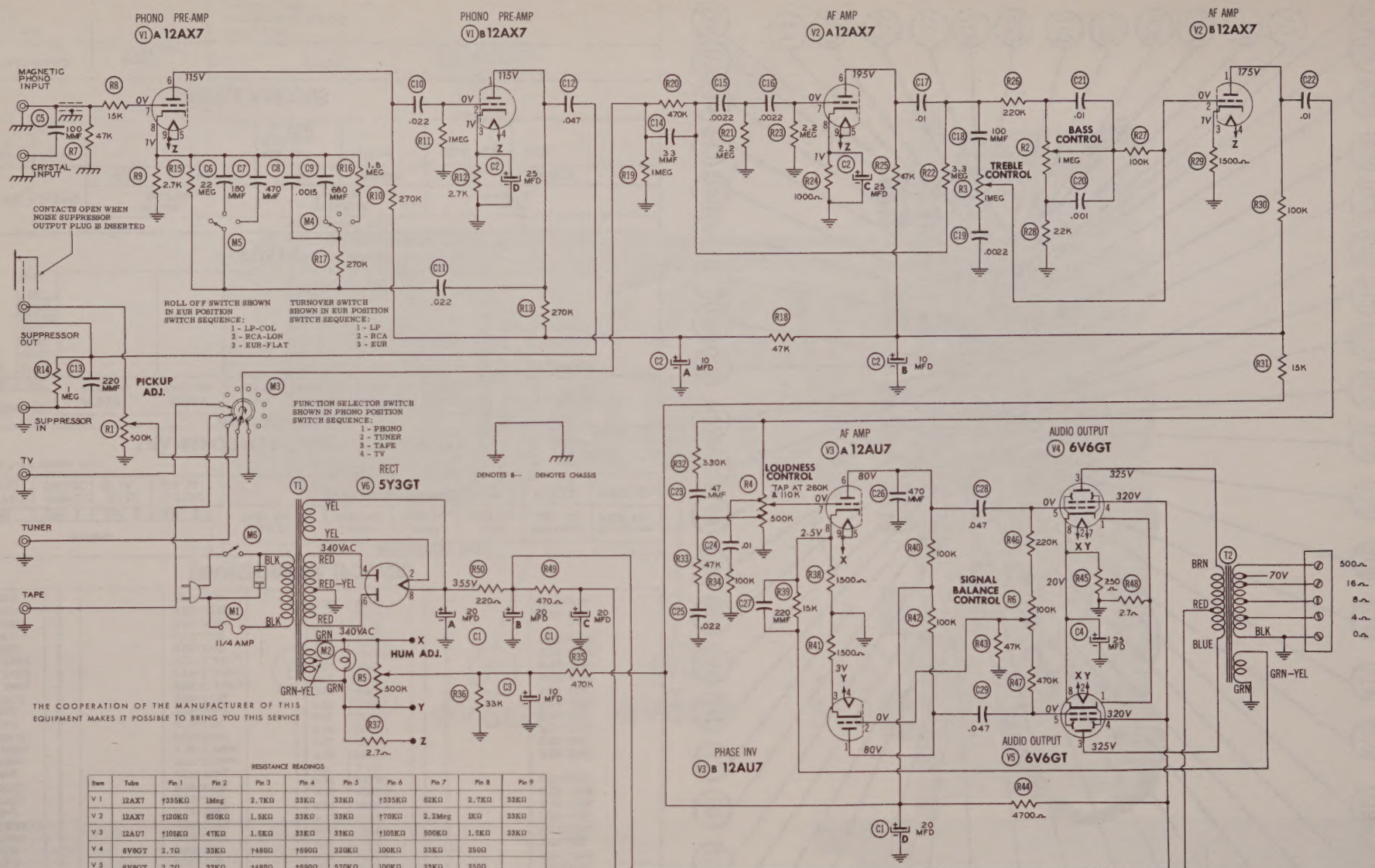
ITEM No.	PART NAME	SCOTT PART No.	NOTES
M2	Dial Light		#47 Bayonet
M3	Switch		Input Selector (wafer)
M4	Switch		Turnover (wafer)
M5	Switch		Roll-off (wafer)
M6	Switch		Power (Toggle)

CHASSIS—BOTTOM VIEW




12AU7
V3
C1
T2
V4
6V6GT
V5
6V6GT
V6
5Y3GT
T1

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO


PHONO PRE-AMP V1A 12AX7
PHONO PRE-AMP V1B 12AX7
AF AMP V2A 12AX7
AF AMP V2B 12AX7
MAGNETIC PHONO INPUT
CRYSTAL INPUT
CONTACTS OPEN WHEN NOISE SUPPRESSOR OUTPUT PLUG IS INSERTED
ROLL OFF SWITCH SHOWN IN EUR POSITION SWITCH SEQUENCE: 1 - LP-COL 2 - RCA-LON 3 - EUR-FLAT
TURNOVER SWITCH SHOWN IN EUR POSITION SWITCH SEQUENCE: 1 - LP 2 - RCA 3 - EUR
SUPPRESSOR OUT
SUPPRESSOR IN
PICKUP ADJ.
FUNCTION SELECTOR SWITCH SHOWN IN PHONO POSITION SWITCH SEQUENCE: 1 - PHONO 2 - TUNER 3 - TAPE 4 - TV
DENOTES B— DENOTES CHASSIS
TV
TUNER
TAPE
11/4 AMP
RECT V6 5Y3GT
HUM ADJ.
THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
AF AMP V3A 12AU7
LOUDNESS CONTROL TAP AT 280K & 110K
PHASE INV V3B 12AU7
AUDIO OUTPUT V4 6V6GT
AUDIO OUTPUT V5 6V6GT
SIGNAL BALANCE CONTROL
BASS CONTROL
TREBLE CONTROL
BRN
RED
BLUE
BLK
GRN
GRN-YEL
500Ω
16Ω
8Ω
4Ω
0Ω
70V

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	12AX7	†335KΩ	1Meg	2.7KΩ	33KΩ	33KΩ	†335KΩ	62KΩ	2.7KΩ	33KΩ
V 2	12AX7	†120KΩ	620KΩ	1.5KΩ	33KΩ	33KΩ	†70KΩ	2.2Meg	1KΩ	33KΩ
V 3	12AU7	†105KΩ	47KΩ	1.5KΩ	33KΩ	33KΩ	†105KΩ	500KΩ	1.5KΩ	33KΩ
V 4	6V6GT	2.7Ω	33KΩ	†480Ω	†690Ω	320KΩ	100KΩ	33KΩ	250Ω	
V 5	6V6GT	2.7Ω	33KΩ	†480Ω	†690Ω	570KΩ	100KΩ	33KΩ	250Ω	
V 6	5Y3GT	INF	100KΩ	INF	140Ω	INF	130Ω	3KΩ	100KΩ	

† MEASURED FROM PIN 8 OF V6

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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